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President's Address.

By SIR JOHN NEWMAN-MORRIS, C.M.G., M.B., B.S., F.R.A.C.S., F.A.C.S.,
Melbourne.

YOUR EXCELLENCY, Honourable Ministers, Your Grace, my Lord Mayor, distinguished visitors, ladies and gentlemen, Sixty years ago the editor of *The Australian Medical Journal* said this:

Presidents of scientific bodies all the world over are called upon by usage to deliver what are called presidential addresses, but difference of opinion may well exist as to the value of this custom. Some object to the usage, regarding it as simply an antiquated survival, often giving occasion to the utterance of well-worn platitudes and well-known facts. Most presidential addresses fall far short of the ideal and their practical utility may well be questioned.

These words embody some of my present views and, perhaps, yours also. However, as "this custom", "this usage", "this antiquated survival" still prevails, I am given the opportunity of publicly thanking those colleagues who have placed me in this exalted position. Also I have the

great privilege of extending the warmest welcome on behalf of the General Committee of Congress to you as members, overseas visitors and distinguished guests. We are grateful, Your Excellency, for the appreciation you have shown to the importance of this Congress by honouring us with your presence and addressing this inaugural meeting. British sovereigns and members of the Royal Family have always evinced a real interest in medical progress and have identified themselves with the organizations, colleges, associations and societies developing it. May I say, sir, that there is no more loyal section of the community than the medical profession. It is, therefore, exceedingly gratifying that so early in her reign our Queen has graciously extended her patronage to the British Medical Association, of which we form an important part. It would give my committee and the members of this Congress great satisfaction and pleasure if you, sir, would convey to Her

Majesty a message of the devotion and loyalty we all bear to her.

My next privilege, and it is a personal one, now that Congress has been fittingly opened, is to thank those members of the medical profession and their wives, the Chancellor, Vice-Chancellor and staff of the University of Melbourne, and officials and members of public bodies who have assisted in the organization of what I believe will be both scientifically and socially a successful and memorable session of Congress.

I proceed now to the utterance of "well-worn platitudes and well-known facts".

Advantage has been taken of this Session to celebrate the centenary of the stabilization of medical organization in this State and, indeed, in Australia. Notice should be taken on such an occasion of the men who first founded and then carried on under great difficulties the Medical Society of Victoria, still linked with the Victorian Branch of the British Medical Association.

The healing art was brought to Australia from Great Britain by a varied assortment of practitioners. Some of these were officials of the armed forces or of government authorities; some came from the spirit of adventure; a few arrived here after clashes with authority. They were a scattered group in the community, with no cohesion. They had graduated from many medical teaching bodies, often in rivalry one with another. There was little except their isolation from the homeland to draw them together. For the most part they were young and inexperienced in practice.

It is difficult at this distant date to envisage the British conditions which formed the educational and cultural background of these young and adventurous medical immigrants. The higher culture of nineteenth-century England was varied, solid and widespread, and Trevelyan, in his "Social History of England", says: "The world is not likely to see again so fine and broad a culture for many centuries to come." Our medical founders brought their share of this culture to Australia and they brought with them also the best ethical standards of British medicine of those days. By the standards of the time they were well and thoroughly trained in medical knowledge. Their own opinion of themselves is recorded in a minute of the Port Phillip Medical Association of December, 1847, which states: "The members of the medical profession in the Australian colonies form a numerous and respectable body of Her Majesty's subjects." The profession now is much more numerous and it is at least just as respectable.

Referring to this State, in 1839 there were six doctors to care for a population of 2000. Amongst the six was David Wilkie, who may be regarded as the founder of medical organization. When the Port Phillip Medical Association was formed in 1846 sixteen doctors joined that infant body. Wilkie was its first vice-president and later became its secretary, and meetings were held in his home. Although this small group kept together only until 1851, their handwritten minute book contains evidence of interest in medical knowledge. The first object which they endeavoured to carry out was the advancement of medical knowledge and a better feeling amongst the members of the medical profession.

It is interesting to recall that one of the early members, David J. Thomas, read a paper in October, 1847, on the administration of ether shortly after the American dentist Morton had demonstrated its use in surgery in Boston.

Out of this group developed the commencement of the medical library in this State. There is on record also the first decision on a matter of medical etiquette, the discussion on which occupied several meetings, and the final verdict stated that:

Mr. S. has been guilty of a breach of medical etiquette but . . . no breach of professional etiquette could have justified Mr. C. in assaulting a professional brother at the bedside of a patient, which conduct on the part of Mr. C. towards Mr. S. the Committee considers as most reprehensible.

This seems to be a very proper verdict.

Wilkie was a Scotchman who received his medical education at the University of Edinburgh, where, at the age of twenty-one, he received the degree of Doctor of Medicine and the diploma of Membership of the Royal College of Surgeons in 1836. At the time of his arrival in Melbourne he was twenty-four years of age.

In May, 1852, Wilkie revived the then scattered profession to form the Victoria Medical Association, out of which grew the Medical Society of Victoria. He was its first president, and again the meetings for the first year or so took place in his home. Wilkie apparently had wide interests, actively pursued. He was a foundation member of the Athenaeum and the Royal Society of Victoria and of the Victorian Medical Benevolent Association. He played an active part in establishing in 1856 *The Australian Medical Journal* and was a regular contributor to its columns. He presented hundreds of books to the medical library. For some years he served in the Colonial Parliament and was responsible for the Bill establishing the British Pharmacopœia as the legal basis for prescribing. He died in Melbourne in April, 1888, at the age of seventy-one.

The new society adopted its charter on July 19, 1852, and it is interesting to recall here both the political and social condition of the colony and the state of medical knowledge at that time. Great credit is due to our young founders for their devotion to medicine in spite of the turbulent conditions that surrounded them, such devotion presenting a striking example of placing first things first.

Australia is at present concerned about the difficulty in coping with an influx of migrants, but these difficulties appear considerably less than those which faced the colony of Victoria in 1852, the year after the discovery of gold, when the population had suddenly grown from 97,000 to 165,000. There was great social and political disorganization, which sprang into existence before the means for its repression could be organized, but by January, 1856, the first number of *The Australian Medical Journal* was able to record in an editorial article that:

The temporary disorganization which succeeded the new source of material wealth has gradually subsided and the Colony of Victoria now occupies in its social and domestic characteristics a position unsurpassed by any dependency of the British Crown.

No undue modesty prevailed in the plans and outlook of the times; indeed, there was a dazzling belief in the marvellous future of Victoria shared by all. This belief was based largely on material prospects, but Henry Gyles Turner, in his "History of the Colony of Victoria", records that: "While much was being done to promote industrial and commercial development, the worried executive, mainly at the instigation of LaTrobe (the Lieutenant-Governor), was responsive to the claim of intellect." Sydney had established a university and endowed it. Melbourne must do as well or better, and in January, 1853, the *Act of Incorporation of the University of Melbourne* was passed. Other cultural bodies were established and in their foundation our medical progenitors took prominent parts.

The new Medical Society soon came on troublous times, and on January 16, 1861, the retiring president, Richard Tracy, our first gynaecologist and the first lecturer on the diseases of women at the University of Melbourne, said in a presidential address:

The Medical Society of Victoria had a good start and bids fair to have a highly prosperous career and to form a central point of organization for the profession in this colony, but you will agree with me that our profession is at all times and under every variety of stress a most difficult one to organize. Dissension, after a little while, began to creep in and some members seceded. Still, the Society was to a great extent prosperous and for some time large additions were made to the library, but still there were dissensions; there was apathy; there were resignations, in spite of which the loyal few who continued to hold the fort exerted great influence on the government and the community.

There were some bright spots in the course of events, for the leaders took the precaution of holding an annual

dinner, and here is a report of one held at Menzies' Hotel in 1862. After referring to the "gargantuan bill of fare" it says:

The utmost geniality prevailed. Little professional differences, which, unfortunately, insist upon intruding themselves into the ordinary experiences of daily life, were by a kind of tacit consent forgotten for a time. A sort of amnesty was acknowledged by common consent and it was impossible not to wish that a cordiality so complete and so exhilarating might be the rule on occasions other than those of special festivity.

Although meetings were sparsely attended, the papers presented were critically and earnestly discussed by the few members present. Perhaps the largest attendance during the sixties took place when the Reverend Dr. Bleasdale, an honorary member of the Society, invited the members to attend at his wine cellars to advocate the use of colonial wines for medicinal purposes, one occasion, no doubt, when the physicians attended to taste their medicine themselves.

There is no doubt, and it is on record, that this small body of earnest leading doctors was responsible for much of the early medical legislation of the colony. The lack of sanitary measures has often been stated, but it is to be remembered that the first effective public health legislation in the Old Country did not arrive until 1868. In the fifties of the last century Louis Pasteur was just entering on the road to his revolutionary discovery of germs as a major cause of disease.

Joseph Lister did not publish his first paper on "Antiseptic Surgery" in *The Lancet* until 1867. Helmholtz, in 1851, had just conferred an inestimable benefit on the world by his invention of the ophthalmoscope, and Czermak, in 1858, made the laryngoscope a prominent part of laryngology. In Melbourne, in 1865, T. S. Ralph pleaded for the greater use of the microscope in diagnosis. Long years were to pass before such diagnostic aids as X rays were made available. In 1859 Florence Nightingale published her "Notes on Nursing", but there were no "Nightingale"-trained nurses in Australian hospitals.

Our founders, therefore, were ignorant of much of what is now common knowledge and practice. Until 1855 they had no means of recording their experiences. In some of the centres the daily Press was used to report interesting medical work, a completely unprofessional means of communication. Dr. Pugh made his first publication on general anaesthesia in the *Launceston Examiner*. An Australian medical journal had been started in Sydney in 1846 as a private venture, but it expired in a year's time and so the new Society decided to establish its own *Australian Medical Journal*, which had a continuous existence for 58 years until it was merged into the present federated journal, *THE MEDICAL JOURNAL OF AUSTRALIA*. The *Australian Medical Journal* was first published in January in 1856, and its founder was John Maund, one of the most remarkable of the medical immigrants of the time. He arrived in Melbourne on January 3, 1853, and died on April 3, 1858, at the age of thirty-five years. In that short half-decade he exerted a great influence on the scientific, cultural and medical affairs of the young colony. Maund was born in Worcestershire in 1823, close to the city of Worcester, where Charles Hastings, the founder of the British Medical Association, was at the time in practice. Maund, after his youthful period of medical apprenticeship, studied at the University of Glasgow. He obtained many prizes and in 1845 received the diploma of the Royal College of Surgeons of England. He then spent a year in post-graduate work in Paris, entered into practice in 1847, and in 1848 took the degree of Doctor of Medicine at the University of St. Andrews. He had been a delicate youth and he sold his practice in 1852 and decided to come to Victoria and follow chemistry instead of medicine, because he thought it would suit his health better. He had pursued chemical studies and received certificates from the Royal College of Chemistry and from the Polytechnic Chemical School. In Melbourne, however, he began medical practice as well as being appointed to the new office of analytical chemist. It is related that Maund "discharged his official duties in the most skilful and efficient manner and made

several valuable analyses of Melbourne's water supply". He was apparently a man of high attainments and fine personal character. He immediately joined the Medical Society and was thereafter a regular attendant at its meetings and became secretary in 1855. He was one of the first editors of the journal which he founded, and contributed to it regularly. He was an original member of the Victorian Institute, now the Royal Society, and Ferdinand von Mueller, the eminent botanist, paid him a graceful tribute by naming after him a new genus "Maundia". His collaborator Richard Tracy gave Maund credit for founding the Women's Hospital. Few medical men can have accomplished so much and laid down so many sound foundations in so short a time.

The first editorial article of *The Australian Medical Journal*, probably written by Maund, evidenced a far-seeing and wide outlook into the future, and a national spirit well ahead of the days of Federation. It predicted that the journal would be "a not unworthy parent of the future medical literature of these colonies and that the time is not distant when, if opportunity is afforded for drawing them into action, talented and highly trained minds, now latent, will be found to represent us fairly and satisfactorily in the scientific arena of the world". I think it can be safely said that there are now more journals throughout the world than are required to record the advances that are steadily being made. May I repeat a recent quotation in the *British Medical Journal*, which states that John Mayon wrote in 1668: "Disease, as it stalks through the land, cannot keep pace with the incurable vice of scribbling about it."

The Society and its journal set about promoting the public good as well as the interests of the profession. Urging the Government on in matters of medical reform, they took active parts in directing attention to the need for establishing a school of medicine. It is to another Englishman that the honour is always granted of founding the Melbourne Medical School. I still remember in my youth seeing the venerable, dignified, bearded figure of Anthony Colling Brownless at the university, where he died in December, 1897, and which he had served for forty-two years. He arrived in Melbourne in 1852 at the age of thirty-five years, having been born in Kent in 1817. Brownless graduated in 1841, after having passed through an exceptionally good thorough medical education, which included an apprenticeship to a country surgeon, years of study and dressership at Saint Bartholomew's Hospital, and five years' work at the University of Liège. In 1846 he graduated M.D. at the University of St. Andrews. In 1854 he was elected physician to the Melbourne Hospital and appointed by the Government to the University Council in 1855. He was elected vice-chancellor in 1858 and chancellor in 1887. He has been described as "courteous in manner, unbending in determination, the founder and fosterer of the Medical School".

Before this event took place any Australians wishing to enter the medical profession had to journey to Britain. This entailed great expense and long years of absence from home.

Undergraduate medical teaching commenced in Australia, if not in the Southern Hemisphere, with three students.

The striking inaugural lectures of the first members of the teaching staff are on record, and the high standard laid down by these men and the system of annual examinations then instituted have been justified in the succeeding generations of students.

In due time complete medical teaching was undertaken in Sydney in 1883, in Adelaide in 1885, and in Brisbane in 1936.

The foundation of the Medical School in the University of Sydney is related in "The Life of Sir T. P. Anderson Stuart", by Epps. Stuart, a graduate of the University of Edinburgh, was the distinguished first professor of anatomy and physiology and the real builder of this school. He is on record as expressing his opinion of the Australian graduate. "In Australia", said Stuart, "he has been a University graduate from the very beginning, and there have been no colleges or corporations of secondary impor-

tance to mar the influence of the University. In my opinion, the general level of the professional capacity in Australia is much higher than it is in the old country, partly because of the generally higher education of the medical man and partly from the fact that so many medical men are thrown upon their own resources by reason of their isolation, when they have to do things which, in the older countries, are dealt with by specialists." Whether Stuart's opinion is justifiable or not, it is confirmed by a more recent observer, Professor Dunlop, of Edinburgh, who, in a report on the state of medicine and medical education in Australia in 1951, stated that the Australian general practitioners were probably the best of their kind in the world and that he was impressed by the type of man he met—their self-reliance, wide reading, skill and enthusiasm. "In remote districts they are indeed doing men's jobs and indeed made me feel very humble."

The medical schools founded by the men whose deeds we are now remembering, and others who followed them in Australia, have provided graduates who have taken their place beside those of all other medical schools of the world. A perusal of the lists of these graduates would indicate the names of men who have achieved fame not only in Australia, but in medical centres elsewhere.

Criticism of our medical schools at the present time does not lie in the direction of standards of education. But the standard is in danger of being weakened by the inability adequately to accommodate the numbers of applicants for a medical education. Melbourne, for reasons of physical limitations, has found it necessary to limit the numbers of those entering the course, and Sydney is said to be heavily overcrowded. The existing four schools must not only educate students from six States, but should find room for overseas students from nearby countries. It seems that the time is overdue for the foundation of medical schools in Western Australia and Tasmania, and indeed, with the growth of population, it is not far distant when perhaps provincial medical schools must be opened in the larger States.

The pioneer school in Melbourne, too, is incomplete, in that it is the only institution lacking professors in medicine and surgery. Shortage of money has always retarded the necessary development, as it did at the start.

The Melbourne Medical School, as such, has not found the rich benefactors that have supported other schools and which it needs.

Our own graduates have built on the foundations laid, starting with Harry Brookes Allen, possibly the most brilliant of them all. The organization of the profession,

the medical literature, and medical education have prospered in their hands. We still look for stimulation and learning to medical leaders in the Mother Country, a little nervously perhaps, since the State has assumed so much control over medicine, a degree of control which we in Australia will continue to resist. But, in spite of our comparative isolation, we must claim to have reached our majority after this hundred years. With that comes a responsibility, a heavy responsibility, as members of a learned profession, to continue to give to the community all possible aid in the prevention of disease and the mitigation of suffering, in return for what the community has done for us, and not only to Australia, but also to our neighbouring countries, backward as many of them are in matters of health.

"Aims, methods and persistency", wrote Abraham Jacobi, "are common to the medical profession of all countries. On its flag is inscribed what should be the life rule of all nations: Fraternity and Solidarity."

Australian medicine in the future must follow wherever medicine leads and will share in whatever praise or blame follows. The achievements claimed for medicine generally are already the subject of criticism and some slight condemnation; interference with the natural control of populations, the increasing birth rates, the diminishing death rates and the longer lives of many people are being used as warnings in the light of static or diminishing food supplies. Medical investigators must continue to pay attention to such problems, as they are now doing, for it is said that "the new techniques of the age, which for the first time in the history of man have begun to achieve power over both life and death, offer hope for the future as well as danger".

The scientific programme of this Session of Congress just opened by His Excellency the Governor-General is designed to pay regard to present and future health problems; there is still an immense amount of ignorance on many vital influences affecting the health of mankind—ignorance which can be dissolved only by more and more intensive research, which, again, needs financial support both from the State and from its citizens.

Ninety years ago *The Australian Medical Journal* expressed the hope that the Medical Society of Victoria might one day grow out of its hitherto limited proportions and become an association practically identical with the profession in Victoria: "A union of the profession in some sort resembling the British Medical Association would be of high practical benefit to us." I think it can be said that this Congress is a fulfilment of that early hope.

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Religious Services.

At Matins on Sunday, August 24, 1952, at Saint Paul's Cathedral, Melbourne, members of Congress attended wearing academic dress. The service was conducted by the Most Reverend J. J. Booth, Archbishop of Melbourne, assisted by the Right Reverend J. D. McKie, Bishop of Geelong, the Very Reverend Roscoe Wilson, Dean of Melbourne, and the Reverend W. R. Dowel, the Acting Precentor. Sir John Newman-Morris, President of the Congress, read one of the lessons, and Professor Lambert C. Rogers, of the University of Wales, read the other. The sermon was preached by the Most Reverend J. J. Booth, Archbishop of Melbourne. He said that the art of healing was divinely inspired. Its leaders and practitioners followed Him "Who went about doing good and healing all manner of diseases". The very discoveries which had rewarded medical research showed that powerful elements which could be used in the cure of disease were already latent in the universe. The occasion that brought members of Congress together was very significant. Not only would they meet distinguished physicians and surgeons; they would be inspired to continue their future researches with vigour. Men of great courage and perseverance had preceded them, whose names they recalled that day. They would follow on with no less energy and vision. In the midst of international and domestic disorder, the Congress was a salutary reminder that there was a great body of distinguished professional men dedicated to the work of healing and restoring order to the bodies and minds of

men. Behind them was the goodwill of the Creator, for every good and perfect gift came from above, and the power to use those gifts came from a sound faith equipped with the knowledge that their science would garner for them. In conclusion Archbishop Booth said that the gifts which the medical profession made available to mankind were accepted without much thought by those who benefited by them. He spoke for many whose gratitude to the medical profession was matched by their confidence in and hope for the future.

At Saint Patrick's Cathedral Solemn High Mass was celebrated on Sunday, August 24, 1952. Members of the medical profession attended in academic dress. The celebrant of the Mass was the Reverend M. Catarinich, the deacon was the Reverend P. Fitzpatrick, and the sub-deacon was the Reverend J. Murray. The Right Reverend Monsignor A. V. Fox, Vicar-General, preached the sermon. Monsignor Fox referred to an address given by His Holiness the Pope at a world congress in Rome in October, 1951. In the course of his address His Holiness had said that the conduct of a reputable and openly Catholic doctor, whose conscience never wavered when there was a question of the natural and divine law, and who fought with all his might in defence of the Christian dignity of married persons and the sacred rights of their offspring, was certainly included in the Lay Apostolate. Monsignor Fox said that the way in which they could carry out their duties in order to merit the honour of being apostles was

by acting in accordance with the moral law themselves in relation to their medical problems, and by trying to spread amongst all doctors knowledge of those moral principles which would make them realize that man's body was sacred, and that joined to that body was a soul put there by God Himself, and that consequently the life of every human being, born and unborn, was to be respected. Monsignor Fox then elaborated what he had said in relation to the problems of abortion, of euthanasia and of artificial insemination. He pointed out the nobility of the work of a doctor in every sphere of the medical profession, but stressed the grave responsibilities of the doctor towards the community and to God. He quoted further words from an address of His Holiness the Pope to a body of nurses, to the effect that their moral energy must be derived from and nourished by a deep and lively faith. They must practise self-denial, they must have purity of heart and a fineness of conscience, so that their service

might be truly the act of supernatural charity demanded by the Christian Faith. In serving the sick they must serve Jesus Christ Himself.

At the Saint Kilda Synagogue on Saturday, August 23, 1952, the service, which was conducted by Rabbi Danglow, O.B.E., V.D., M.A., the Reverend B. Wreschner, B.A., Dip. Ed., and Cantor L. Aisenstadt, was attended by Jewish members of Congress. Special prayers were recited. In his sermon, which was on the subject of "Judaism and Health", Rabbi Danglow dealt with the laws of hygiene as taught and practised by Jews from olden times, and spoke of the valuable contribution which Jews had made to medical science during and since the Middle Ages. He cited Sir William Osler as the ideal British physician, and paid a tribute to the selfless and beneficent activities of research workers in medicine and surgery, many of whom had sacrificed themselves as martyrs upon the altar of science.

Inaugural Meeting.

On the evening of August 25, 1952, the inaugural meeting of the eighth session of the Australasian Medical Congress (British Medical Association) was held at the Exhibition Building, Melbourne. The opening ceremony was performed by His Excellency the Right Honourable Sir William McKell, Governor-General of the Commonwealth of Australia.

In his opening remarks His Excellency Sir William McKell said that the occasion combined all the activity of a congress widely representative of medical science with the centenary of Australia's oldest medical society, the Medical Society of Victoria. He referred briefly to the early days of the society and the foresight and tenacity of purpose of its founders, to the preservation of its identity even after its fusion with the Victorian Branch of the British Medical Association in 1907, and to the present high standard of medical practice, teaching and research in Melbourne. Turning to the subject of Congress, Sir William McKell suggested that the main incentive to attendance at such gatherings was the stimulating experience of meeting fellow members of the medical profession, including the especially able and eminent. He spoke of the first medical congress in Australia, which described itself as "inter-colonial", and of the series of con-

gresses up to and since the time when they were taken over by the British Medical Association in Australia. Sir William McKell said that he had emphasized the value of Congress in its informal and social aspects, but naturally its contribution to medical knowledge was made chiefly through the papers read. He cited important pioneer work on the sympathetic nervous system presented at the Congress in 1923, work which had played an important part in the development of surgery of that system, and suggested that presentation of work at a congress helped to gain it a wider and more appreciative world audience. Sir William McKell referred briefly to Australia's contribution to medical knowledge, including early work on filariasis and the transmission of disease by mosquitoes, the relationship of maternal rubella to congenital defects, the recognition of pink disease, the study of hydatid disease, the development of thyroid surgery and the study of tropical diseases and "Q" fever. He concluded with some remarks on the progress of medical thought to its present emphasis on positive health.

President's Address.

Sir John Newman-Morris, the President, then delivered his president's address (see page 461).

Conferring of Degrees and Henry Simpson Newland Oration.

On the evening of Wednesday, August 27, 1952, in the Melbourne Town Hall, honorary degrees were conferred on distinguished visitors to the Congress by the Council of the University of Melbourne. The degree of Doctor of Laws was conferred on Professor C. H. Best, C.B.E., M.A. (Lond.), D.Sc. (Lond. Oxon, Paris and Chic.), Sc.D. (Camb.), M.D. (Amsterdam, Louvain, Liège and Tor.), LL.D. (Dal.), F.R.S., F.R.S.C., F.R.S.C.P. (Can.), of Toronto, Canada, and on Sir Henry Newland, Kt., D.S.O., M.B., M.S., F.R.C.S., F.R.A.C.S., F.R.C.S. (Edin.), F.A.C.S., of Adelaide. The degree of Doctor of Medicine was conferred on the following: Professor W. E. Le Gros Clark, D.Sc. (Lond.), M.A. (Hertf.), F.R.C.S., F.R.S., of England; Professor E. C. Dodds, M.V.O., D.Sc., Ph.D., M.D., B.S., F.R.C.P., F.R.I.C., F.R.S., of England; Dr. John Foster, M.A., M.B., B.Chir. (Camb.), F.R.C.S., L.R.C.P., D.O.M.S., of England; Dr. N. McCa. Gregg, M.C., M.B., Ch.M., F.R.A.C.S., D.O.M.S., of Sydney; Dr. F. Avery Jones, M.D., B.S. (Lond.), F.R.C.P., M.R.C.S., of England; Dr. A. B. Reese, B.S. (Davidson College), D.Sc. (Hon.), M.D. (Harvard), of the United States of America; Professor Lambert Rogers, V.R.D., M.Sc., F.R.C.S., F.R.C.S.E., F.R.A.C.S., F.A.C.S., of Wales. The ceremony was con-

ducted by Sir Charles Lowe, Chancellor of the University of Melbourne, assisted by Professor Boyce Gibson, Chairman of the Professorial Board, and Professor R. D. Wright, Dean of the Faculty of Medicine.

At the conclusion of the ceremony, Sir John Newman-Morris introduced Sir Victor Hurley, who delivered the first Henry Simpson Newland Oration (see THE MEDICAL JOURNAL OF AUSTRALIA, September 13, 1952, page 361).

A vote of thanks to Sir Victor Hurley was moved by Dr. A. J. Collins, President of the Federal Council of the British Medical Association in Australia.

Sir John Newman-Morris then presented two prizes. The British Medical Association Prize, which was inaugurated by the General Executive of the 1935 Annual Meeting of the British Medical Association and is awarded triennially for original work in medicine, was presented to Dr. B. P. McCloskey, of Melbourne, for his work on the relationship of prophylactic inoculations to the onset of poliomyelitis. The Crawford Mollison Prize, which had been awarded to Professor Gordon Cameron, of University College Hospital, London, for his book "The Pathology of the Cell", was received by Dr. Leslie Hurley on behalf of Professor Cameron.

Plenary Sessions.

HYPERTENSION.

A PLENARY SESSION was held on the subject of hypertension. The chairman was E. S. J. KING (Victoria). Professor King opened the session by explaining that he and his colleagues on the panel would discuss some selected aspects of the subject of practical importance from various points of approach. He then introduced the members of the panel: ALEX MURPHY (Queensland), physician; I. DOUGLAS MILLER (New South Wales), surgeon; KEVIN O'DAY (Victoria), ophthalmologist; R. H. ORTON (Victoria), anaesthetist; A. J. BARNETT (Victoria), clinical research member; F. B. BYROM (New South Wales), research experimentalist. Professor King was himself the pathologist on the panel. Questions were directed as follows by members of the panel to one another.

What pathological conditions lead to the development of hypertension? (DR. MURPHY to PROFESSOR KING.)

Professor King defined hypertension as a permanent elevation of the systolic and the diastolic blood pressures. He said that the pressure was affected by a number of influences, some of which were but dimly appreciated and as yet not understood. It depended on two physical factors: the output of the cardiac pump and the resistance of the vascular canals. The viscosity of the fluid and the size of the canals determined the resistance. The viscosity was affected by only one or two well-known conditions which did not need to be considered in the present discussion. By nervous or chemical stimuli causing muscle contraction and relaxation, the size of the canals and the capacity of the vessels could be changed considerably. It was also known that certain hormones influenced the conditions of the vessels considerably and therefore affected the blood pressure.

He went on to say that hypertension as a symptom occurred in a wide variety of diseases, which could be classified into two main groups, based on whether or not the cause of the hypertension was apparent. The term "primary hypertension" was thus opposed to the term "secondary hypertension"; in the latter group they had some idea of the cause. The importance of making the distinction was the opportunity to remove the cause by treatment when that course of action was feasible. Professor King illustrated these remarks by referring to hypertension associated with phaeochromocytoma. He said that the tumour was almost always unilateral and was composed of cells which secreted a form of adrenaline over a long period. Pathological states of the kidney such as polycystic disease, renal compressing tumours and glomerulonephritis were further examples associated with secondary hypertension. Classification into benign and malignant types merely indicated the rate of the development of the hypertensive state and its degree of severity.

In summary, Professor King said that the mechanism of production of hypertension was known precisely in some cases, but was quite obscure in many others, though the factors responsible were nervous and hormonal. A great deal of information had been collected clinically, however, and he asked Dr. Murphy to express an opinion about the influence of heredity in hypertension.

What is the influence of heredity in the development of hypertension? (PROFESSOR KING to DR. MURPHY.)

Dr. Murphy said that heredity was a very important factor. He had for many years made careful inquiry into the family details. He had asked hypertensive subjects about the occurrence of the condition amongst their near relatives and had been impressed by the replies. He was not prepared to state the result numerically, as he had not compiled the statistics, but he would quote from a published investigation. On analysis of data concerning 1524 members of 277 families it was found that (a) with both parents

normal, the incidence of elevated blood pressure in their children was 3%, (b) with one parent hypertensive, the incidence in the children was 28%, and (c) with both parents hypertensive, 45% of the children were hypertensive. He added that among hyperreactors to the cold pressor test, the history of hypertensive symptoms was five times as frequent on comparison with those that reacted normally. Another interesting fact was that hypertension, which was rare in Orientals and Negroes, came with crossing with Europeans.

Dr. Murphy said that the practical value of the family history of hypertension lay in its application in "essential" hypertension; in a case of uncertain origin a suggestive family history offered odds of a six to one chance that it was "essential", whereas with normotensive parents the chances were three to one in favour of the presence of a cause which would be discovered on careful and thorough investigation.

What are the earliest changes indicative of a hypertensive state that are visible on examination of the eye? (DR. MURPHY to DR. O'DAY.)

Dr. O'Day said that the question might be considered to imply that changes visible in the eye always occurred at an early stage of the hypertension, but that was not the case. The hypertension might run its course without any significant fundal changes, or on the other hand the first hint of trouble might be revealed through the ophthalmoscope. The earliest change detected was usually a variation in calibre of the arteries, followed later by broadening of the light reflex, which became brighter as well as wider. Nipping at the arterio-venous crossings would probably be the next stage. It was to be remembered that it was the blood column and not the vessel wall which was under investigation when the fundus of the eye was examined. The brightness of the line of light along a vessel varied with the illumination, which had to be constant before the brightness was interpreted in relation to the transparency of the ocular media. Increase in the thickness of the wall of the vessel would increase the width of the light reflex, but those signs should be construed with great caution as other factors could be involved. Arterio-venous "nipping" was ascribable to thickening of the vascular sheaths where the vessels crossed. There might be an actual thrombosis at the crossing; but it was doubtful whether changes in the vessel walls occurred; the muscular coat analogous to that demonstrable in other blood vessels was extremely hard to differentiate in histological preparations of the fundal vessels; the elastic membrane was absent and, indeed, it was hard to separate an arteriole from a venule.

Dr. O'Day then expressed the opinion that, in general, before the ophthalmologist obtained definite evidence, the systolic blood pressure was usually up to about 200 millimetres of mercury. As there was a close affinity in the anatomical features of the eye and the brain, Dr. O'Day asked Dr. Byrom the next question.

Can you throw any light on the mechanism of hypertensive encephalopathy? (DR. O'DAY to DR. BYROM.)

Dr. Byrom said that some years earlier he had experimented on hypertensive rats. It was easy to produce hypertension in rats, and sooner or later cerebral symptoms occurred comparable with those noted in the human subject. They consisted of convulsions, focal disturbances, and evidences of increased intracranial tension which could occur singly or in combination. Organic lesions were found in serial sections of the brain in approximately half of the instances, but were absent in the remainder; encephalopathy was not invariably the result of organic damage. The water content of the brain was increased progressively with the encephalopathy until death might occur from cerebral oedema. There were parallel changes in the intra-

cranial tension, and it was of interest to examine the ocular fundi.

Dr. Byrom explained that the dye, trypan blue, was unable to cross the intact capillary membrane and when injected intravenously would not stain the normal brain. That observation was used in further studies of the nature of the oedema. In encephalopathy multiple blue spots were found in the cerebral cortex after injection of trypan blue. Some of the spots corresponded with organic lesions, but usually no structural damage was found; however, the water content of the portions of brain containing the blue spots was considerably raised and was much higher than that of the intervening unstained zones. The conclusion drawn from the experiments was that in encephalopathy a local disturbance of arterial function occurred which, when mild, caused an increase in capillary permeability and focal oedema, and when severe caused local death of arteries or brain tissue or both.

Dr. Byrom then discussed the nature of the disturbance of arterial function with special reference to the possibility that spasm occurred. He said that measurements of the rate of blood flow through the internal carotid artery showed a reduction in flow, particularly in the late stages of the process. That was consistent with the occurrence of spasm, but could equally well be a result of the oedema. In order to obtain some more direct evidence, permanent "Perspex" windows were inserted in the skulls of many rats and serial photographs of the cerebral arteries were taken. They showed that extensive though patchy arterial spasm was regularly present in encephalopathy and only very rarely under other conditions. By removal of the Goldblatt clip from the renal artery, the hypertension could be abolished; the spasm and the symptoms disappeared overnight. With the reservation that they had not yet entirely excluded the possibility that the spasm might be an artefact related to the window, the experimental evidence was in general agreement with Volhard's opinion that encephalopathy was an expression of arterial spasm precipitated by excessive intraarterial tension.

Dr. Byrom then said that the retina was often described as the mirror of the brain. He was not sure that that description was an accurate one. It was obviously impracticable, however, to inject trypan blue into human patients or to put windows in their skulls.

What is the relationship between the hæmorrhages and other vascular changes observed in the retina and those in the brain and other organs? (DR. BYROM to DR. O'DAY.)

Dr. O'Day said that he felt he could safely reply that there was very little relationship between them. It seemed reasonable on the face of it to deduce from the fundal appearances what was happening inside the skull. The affection was patchy, however, anywhere and everywhere, and the fundal vessels would often escape when others were involved. Many of the changes in the brain were capillary, and those of retinitis were indubitably in the capillary system, but the view obtained of the latter was magnified. Bleeding from the larger retinal vessels was uncommon, but it was a major disaster to the eye; the vitreous usually filled rapidly, and it was not possible to examine the fundus. Hæmorrhage from the cerebral vessels was associated with damage to relatively large retinal arteries. Because of the difference in structure of the retinal vessels and those of similar size elsewhere in the body, it seemed unreasonable to apply the pathology of other arteries to those of the retina.

Dr. O'Day then referred to the tendency of recent research work to show that in hypertension (as in diabetes) the first sign of capillary damage in the retina was the formation of small aneurysms, especially on the venous side, with slowing of the blood flow, starvation of the tissues and rupture of the capillary wall. When the aneurysm burst, a small hæmorrhage resulted. In the nerve fibre layer the blood pushed its way amongst the fibres and assumed the familiar flame shape, but in the deeper layers the minute hæmorrhages were often rounder. Hæmorrhages disappeared and new ones appeared, but the over-all picture remained much the same from time to

time. He then mentioned that a similar mechanism accounted for the appearance of "exudates". As the incidence of hypertensive fundal signs was capricious, it was not reasonable to draw any conclusions as to what might happen elsewhere from what was seen through the ophthalmoscope.

What is the nature of the pathological changes in the vessels in hypertension? (DR. O'DAY to PROFESSOR KING.)

Professor King explained that changes occurred in many vessels, but were seen characteristically in the arterioles which ranged in diameter from about 25μ to 100μ , and those were the vessels which played the greatest part in the determination of blood pressure. In the early stages the changes were purely functional; contraction or spasm of the vessels occurred without any corresponding structural alteration. Progressively, however, the amount of muscle increased, and then more supporting connective tissue was formed. The changes were found in every layer and were proportional to the severity of the disease, and, in the later stages, the diameter of the vessels was permanently diminished. He explained also the "fibrinoid" degeneration and necrotic changes in the walls of the vessels and said that the damage was accentuated by the effect of the increased pressure of the circulating blood itself. He pointed out that the process was reversible at first before the occurrence of the morphological changes. The changes were characteristically patchy, and the assumption that they were due to the mechanical effects of high blood pressure had to be modified considerably as a result of recent observations of the effect of methonium on the vessels; the improvement was manifested without permanent reduction of the blood pressure. There was some nervous or hormonal action causing contraction of the vessels, but the mechanism was as yet but incompletely understood.

What is your opinion on the effect of smoking on the vessels in the hypertensive state? (PROFESSOR KING to DR. MURPHY.)

Dr. Murphy replied that he thought that the effect was significant while the pressure was labile and the arterioles were still capable of responding to vasomotor stimuli. Tobacco consumption led to vasoconstriction, increased the heart rate and raised the blood pressure. The effects varied greatly on different individuals and from time to time on any individual, but repeated provocation of vasopressor responses would assist in the change from lability to the sustained form of hypertension. Cessation of smoking was frequently followed by abatement or disappearance of the hypertensive headache; that observation alone had convinced him that smoking was harmful for those people who suffered from the complaint. However, Dr. Murphy was of the further opinion that the elevated systolic pressure need not deprive the addict of his drug when sclerotic changes and calcification in large and medium arteries was associated with systolic but not diastolic hypertension.

What benefit may be expected from the use of the methonium compounds in the treatment of patients with arterial hypertension? (DR. MURPHY to DR. BARNETT.)

Dr. Barnett said that the methonium compounds were the most valuable drugs at present available for the treatment of arterial hypertension. When they were given intramuscularly, in most cases a fall in blood pressure was produced initially, often to normotensive levels. Intermittent use led to fairly rapid tolerance to the action of the drug, necessitating steady increments of the dose to be given. By continued administration, three times a day, it was often possible to keep the blood pressure at a somewhat lower level but not within the normotensive range. In his experience he had found that the long-term lowering effect was disappointing; after a period of twelve months the blood pressures were usually not greatly different from the readings at the beginning of the therapy, particularly when the treatment was given by the oral route. The relief of the symptoms was much more gratifying than the effect of methonium therapy on the blood pressure. Hypertensive headache was relieved or abolished in many

instances. Attacks of paroxysmal dyspnoea might be lessened or prevented. Eyesight could improve, and often there was an increased sense of well-being.

Dr. Barnett remarked that though structural changes produced by the disease could not be undone, it seemed that the use of methonium compounds could often slow down or even arrest the progress of those changes. That effect was seen most dramatically in the ocular fundi. Papilloedema regressed, hæmorrhages and soft exudates became much less numerous or disappeared. Harder exudates were relatively unaffected or might become more conspicuous as the retinal oedema subsided. In most cases the findings from tests of renal and cardiac function were changed very little over twelve months, but deterioration without treatment was to be expected. With the use of the methonium compounds the "malignant" phase of the disease appeared to him to have been changed in many instances to a "benign" phase.

What is your experience of the value of sympathectomy in the treatment of hypertension and how do you assess the results? (DR. BARNETT to DR. MILLER.)

Dr. Miller said that no surgeon had ever claimed the ability to cure essential hypertension, but the objective was the alleviation of the more distressing symptoms. In the past six years or so he had performed the operation of sympathectomy for over two hundred patients, and he was satisfied that the paralyzing lassitude and troublesome headaches had been substantially mitigated or relieved. From a large "follow-up" series in other centres it was found that the expectation of life was considerably prolonged in grades two, three and four of hypertension. Disasters such as impending congestive heart failure or blindness, crippling headache and extreme lassitude could be reversed or abolished by means of the operation, and the symptomatic relief could endure for years. He added that the rationale of the operation was still in doubt. At first it had been assumed that the denervation of the splanchnic bed led to a pooling of blood volume and thus to an unloading of the general intravascular pressure. Others held the view that the activating factor in gaining relief was the denervation of the suprarenals and the kidneys themselves. He made brief reference to the work of Adson and Peate and to the Poppin operation. He stated that the procedures relieved the symptoms and some of the organic changes, but it was not known what it was in the operation that was productive of the benefits.

Speaking of the method of assessment of the results of operation, Dr. Miller said that, in his opinion, the length of the period of alleviation of the symptoms of any serious disease was the chief mark of the success of the treatment adopted. The appreciation of improvement by the patient was achieved in the vast majority of instances. Much less encouraging results followed an operative attack on the objective findings of the sphygmomanometer when the hypertension was symptomless and discovered accidentally as at life assurance medical examinations.

Can natural resolution of fundal changes occur? (PROFESSOR KING to DR. O'DAY.)

Dr. O'Day said that the effects of hypertension on vision were of great import; sympathectomy often helped, but methonium treatment was also valuable for saving a patient from impending blindness. He could say that papilloedema might subside and the exudates and hæmorrhages could disappear spontaneously, but the changes in the arterial walls would remain and the general appearance of the fundus would not become normal. The vision might reach normal limits even after there had been a star figure at the macula. The fovea, however, was the all-important area, and provided that too much damage had not been done during the retinitis, the patient might be able to read. Areas affected by thrombosis of branches of the retinal vessels could not be expected ever to function normally afterwards. He recalled to mind a severe case in which, two years later, the patient was still able to read; though the oedema had subsided, the structural changes in the vessels had persisted.

What is the importance of hypertension in patients requiring an anæsthetic? (PROFESSOR KING to DR. ORTON.)

Dr. Orton said that the importance in anæsthesia of maintaining the blood pressure at the normal level throughout the administration of an anæsthetic was no longer applicable in certain circumstances. With the introduction of controlled hypotension into anæsthesia, by means of total spinal analgesia and the methonium compounds, the blood pressure could be lowered deliberately to levels at which bleeding was reduced to a minimum. It was considered by many that that procedure was not dangerous, provided that the cardiac output was maintained and that the very low pressures were not unduly prolonged. Similarly it was safe to use the barbiturates, such as thiopentone, to lower the peripheral resistance in the vascular bed by reducing sympathetic activity. The rule with spinal analgesia was that the higher the level of analgesia, the lower the level to which the blood pressure would fall. When the patient suffered from hypertension it was unwise to allow the blood pressure to fall to low levels that would be tolerated by healthy patients. The systolic pressure should not be below 80 millimetres of mercury at any time or be kept under 100 millimetres for longer than, say, twenty minutes. Relaxing agents should be chosen that would not unduly depress the sympathetic system. Lowering of the blood pressure during anæsthesia might be helpful to the surgeon in keeping the operative field free of blood, but the anæsthetist had to keep in mind the possibility of contributing thus to cerebral complications; the patient might return to the ward in an apparently satisfactory state, but might develop hemiplegia later.

How long is it, in a patient who has hypertension due to unilateral renal disease, before irreversible changes appear in the opposite kidney? (DR. ORTON to DR. BYROM.)

Dr. Byrom said that he would have to base his estimate on experience with rats in which one renal artery was constricted and the opposite kidney left undisturbed. Mild or moderate hypertension might be allowed to continue almost indefinitely without damage to the second kidney and could be abolished in a few hours by excising the first kidney. If the hypertension was severe, a succession of localized arterial necroses would occur in the second kidney. On healing, those lesions would act as multiple Goldblatt clamps, and in a matter of weeks the hypertension would be irreversible. Dr. Byrom's estimate in the human subject with sufficiently severe hypertension was that it would take from a few months to a year to reach that stage. He believed that for patients with hypertension and unilateral renal disease, nephrectomy should be seriously considered, provided that the primary renal disease was strictly unilateral, the function of the opposite kidney was within normal limits and there was not a family history of hypertension.

Why does the blood pressure return to normal after removal of the clip from the renal artery in the experimental animal? (PROFESSOR KING to DR. BYROM.)

Dr. Byrom said that if a rat was made hypertensive by excision of one kidney and clamping of the artery to the other kidney, removal of the clamp permanently abolished the hypertension within twenty-four hours, even after many months. The clamp protected the kidney from secondary hypertensive damage. Renal hypertension was believed to be caused and sustained by something produced by the kidney. The nature of that factor was still unknown, but it did not necessarily cause essential hypertension. He emphasized that his ideas were merely impressions gained from animal experiments.

What are the indications for and the contraindications against sympathectomy? (DR. BYROM to DR. MILLER.)

Dr. Miller said quite definitely that the operation was contraindicated for people much over the age of fifty years, and for those with incompetent renal function as judged particularly by a blood urea content higher than 40 milligrammes per centum. With those exceptions any other

patient was suitable for consideration. Indications were severe optic disk changes, impending cardiac damage, severe angina or other disabling symptoms, such as paralyzing lassitude or crippling headache. When indications and contraindications were less definite, the patient had to make the decision after receiving guidance from a competent physician.

What are the risks of the operation of sympathectomy for hypertension? (DR. BARNETT to DR. MILLER.)

Dr. Miller said that the risks were not great. The immediate operative mortality had not exceeded 3% in his personal series of over 200 cases. Some patients who were in a perilous state before operation had died soon after discharge from hospital. For some months after operation it was usual for the patient to be rather heavily invalided; he would be easily fatigued, faint on rising (from postural hypotension) and liable to cardiac palpitation. Adjustment occurred in a few months; Dr. Miller had had only one case in which those troubles had persisted for as long as a year.

What is the position in patients with anginal pain? (DR. MURPHY to DR. MILLER.)

Dr. Miller said that a patient with severe anginal pain should, in his opinion, be subjected to the more extensive operation, indicated by Poppin, in which the sympathectomy was carried upwards in the thorax to include the second thoracic sympathetic ganglion. It was advisable to relieve the patient of his angina by operating on the upper part of the sympathetic chain alone at the first operation. The patient thus became improved and was in a better position to withstand the rest of the sympathectomy at a later date. Dr. Miller said that the class of patients under discussion included those with the most serious operative risk. They also presented the heaviest responsibility for the anaesthetist.

What is the safest way of dealing with the peculiar difficulties associated with anaesthesia for anginal patients requiring sympathectomy? (DR. MILLER to DR. ORTON.)

Dr. Orton said that it was of paramount importance that the anaesthesia should be skilfully administered. The methods used varied from clinic to clinic. Some neurosurgeons desired a bloodless field, and total spinal analgesia was then used; the blood pressure could drop to unrecordable levels. In other places standard inhalational anaesthetic methods were preferred. The anaesthetist had to bear in mind that a hazard was always present when an open pneumothorax was produced, as the surgeon entered the pleural cavity. Endotracheal anaesthesia should be used, and respiration had to be controlled as the necessity arose. Some anaesthetists preferred anaesthetics or noradrenaline to the sudden dropping of blood pressure to avoid the venous oozing. Mental impairment might result if the blood pressure was allowed to go very low and stay there for twenty minutes.

Are there any risks or contraindications to the use of the methonium compounds? (DR. ORTON to DR. BARNETT.)

Dr. Barnett said that all patients experienced unpleasant symptoms from the drugs, such as attacks of faintness from postural lowering of blood pressure, until adjustment was achieved. Most of the symptoms were ascribable to autonomic ganglionic blockage where it was not desired, leading to dryness of the mouth, blurring of vision, constipation and sometimes difficult micturition. Dr. Barnett referred to extremely low blood pressure effects and paralytic ileus as uncommon severe conditions encountered in association with methonium therapy. The appropriate remedies were noradrenaline drip therapy for the depressed pressure and administration of carbachol or some other cholinergic drug for ileus. He expressed the opinion that the methonium compounds should be withheld from patients with benign hypertension without severe symptoms. They were ineffective in producing a prolonged reduction of blood pressure and were contraindicated for elderly people with advanced arteriosclerosis and for those with gross

renal failure, though a cautious trial was justifiable when the renal insufficiency was only moderate in degree. Attempts should be made in treatment to raise the cardiac output rather than to procure vasoconstriction.

What are the indications for methonium therapy in hypertension? (PROFESSOR KING to DR. BARNETT.)

Dr. Barnett said that the methonium compounds were indicated in persons of the younger age groups with grave symptoms and considerable arterial hypertension. He mentioned headaches, paroxysmal dyspnoea and ocular hemorrhages, exudates and papilledema, and said that if sympathectomy was considered by the surgeon to present an unreasonable risk, methonium treatment might be undertaken. At present it was difficult to decide the relative merits of surgical and medical systems of management, but the passage of time and the prolongation of the observational period after methonium therapy would clarify the comparison in a few years. Neither method dealt effectively with the basic abnormality underlying "essential" hypertension. The close, careful and prolonged medical supervision of the effects of the use of the methonium drugs was rated as a disadvantage, but the facts that its administration could be discontinued readily if something more satisfactory was undertaken and that its use was not productive of any permanent damage were advantageous aspects of the problem.

What are the difficulties and complications in the administration of anaesthetic agents to patients who are being treated with drugs of the methonium series? (DR. BARNETT to DR. ORTON.)

Dr. Orton said that a very real problem arose, as methonium was being widely used; a new danger had been added to the administration of anaesthetics. Profound and fatal dropping of blood pressure might follow the induction of anaesthesia in those circumstances. It was of great importance that the anaesthetist should know all the details of treatment of each patient beforehand. The blood pressure reading taken by the anaesthetist as a preliminary to induction would be likely to lie within the range of normality, and that knowledge might disarm the anaesthetist. With the barbiturates and "Pentothal" administration, a potentiation of the action of the methonium compound was liable to precipitate a disastrous fall in blood pressure. At other times the patient was presented at operation in a state of hypotension, and the blood pressure could not be raised by the usual methods if a steep fall occurred. Anaesthetists undertook their work for those patients with the utmost caution and avoided the use of hypotensive drugs likely to potentiate the action of the methonium compounds.

To what extent should a patient be informed that he has essential hypertension? Should he be supplied with the blood pressure readings? Should investigation be undertaken? (DR. ORTON to DR. MURPHY.)

Dr. Murphy described the questions as practical and comprehensive. He said that if the physician considered that medical or surgical sympathectomy might be required, the cardiac and renal functions should be assessed. An anxiety state might be engendered if the knowledge was conveyed tactlessly to the patient, and it was unwise to keep him posted with the exact figures of blood pressure measurements. If the discovery of hypertension was incidental it might not be necessary to mention it. It was foolish, however, to tell an intelligent person that nothing had been found wrong with him and then to have to advise radical alterations of his diet and restrictions of his activity.

Professor King, from the chair, summed up by saying that the members of the panel had discussed some of the things that had appealed to them as likely to be of interest to the audience. They had not by any means covered the whole subject and had avoided digressions into details. They had brought out clearly that the subject was very complicated and that there were many things about it which were not yet known or were but little understood.

A REVIEW OF THE ANTIBIOTICS.

A PLENARY SESSION was held on the subject of "A Review of the Antibiotics". The chairman was E. F. THOMSON (New South Wales). The other members of the panel were as follows: JEAN TOLHURST, M.Sc. (Victoria), bacteriologist; STANLEY WILLIAMS (Victoria), paediatric physician; A. E. LEE (Queensland), surgeon; A. M. HILL (Victoria), obstetrician; JOHN FUNDER (Victoria), clinical pathologist. Dr. Thomson, as leader of the panel, submitted the questions and commented briefly on the answers.

QUESTION 1.—Is it necessary to isolate and identify the causal organisms in cases of bacterial infection either medical or surgical?

MISS TOLHURST, in reply, said that the use of antibiotics and the fact that different organisms varied in their sensitivity to different drugs had made bacteriological diagnosis far more important than ever before. While it was possible in a number of cases to guess successfully at the best chemotherapy on clinical grounds alone, there was no doubt whatever that a far greater proportion of successes was obtained when the bacteriological picture and the sensitivity of the organisms were known. Unfortunately, chemotherapy, even when it did not cure an infection, often masked the bacteriological picture, so it was always important to consider whether specimens for investigation could be collected first. If the patient was very ill, there was of course no question of withholding treatment while waiting for the bacteriological report.

Miss Tolhurst then considered the question of how the bacteriologist might help the clinician by reference to some particular diseases and infections. She said that in pneumonia, as seen in general practice, the diagnosis was usually made clinically and the patient was treated empirically. The Medical Research Council of the Privy Council had recently surveyed 267 cases of clinical pneumonia in which special bacteriological investigations were made, and had found that penicillin given by injection was at least as good as, if not better than, any other drug for empirical therapy. The commonest cause of failure was probably inadequate dosage. When patients failed to respond to adequate dosage within twenty-four hours, the most important test was a leucocyte count, since leucocytosis was found in bacterial pneumonia and leucopenia in virus pneumonia. Seriously ill patients admitted to hospital should have a blood culture and leucocyte count carried out at once. Smears and cultures of sputum should be made, particularly in a search for penicillin-resistant staphylococci and Friedländer's bacillus; but those organisms and many others could be found at times in any sputum, so that the results of these tests could be misleading and needed to be interpreted in relation to the leucocyte count and the clinical and radiological findings. The possibility of acute tuberculous bronchopneumonia had to be kept in mind.

Referring to acute tonsillitis due to hæmolytic streptococci, Miss Tolhurst said that the diagnosis was made clinically and that there was no need as a rule to attempt cultures for streptococci. But a warning should be sounded about diphtheria. It was not always possible to distinguish clinically between a streptococcal throat and an early diphtheritic throat. Once penicillin had been given, the diphtheria bacillus could not be grown. Hence a swab taken as an afterthought was not only useless but harmful, because the negative report was misleading and the antitoxin might be withheld until it was too late. Penicillin should not be withheld while the bacteriological diagnosis was made, but a special serum-treated swab as supplied by the Department of Public Health should be taken first and delivered to a laboratory within twenty-four hours, or any swab might be used to inoculate a Löffler's serum slope.

Miss Tolhurst then referred to septicæmia. She said that the bacteriological picture was important, because the treatment of choice, for example, of a hæmolytic streptococcal,

staphylococcal or typhoid infection would be different in each case. A leucocyte count was often helpful. In acute cases therapy would be given immediately after attempted blood culture and would be subsequently modified if necessary. Anaerobic cultures should be attempted so that anaerobic streptococci and anaerobic Gram-negative bacilli were not missed. Those organisms were common in puerperal infections, and might cause septicæmia following trauma to the bowel as from a swallowed fishbone.

Turning to subacute bacterial endocarditis, Miss Tolhurst said that unless the patient was desperately ill, chemotherapy should be withheld until one or several blood cultures had been attempted. Positive cultural findings clinched the diagnosis as well as guiding the therapy.

The laboratory played an important role in the diagnosis of meningitis. Organisms could often be identified in smears of purulent cerebro-spinal fluid. Thus pneumococci or meningococci might be seen and were sensitive to penicillin, and provided that the diagnosis was made early and massive doses of crystalline penicillin were given, the outcome was usually satisfactory. But if Gram-negative bacilli were seen, such drugs as "Chloromycetin", sulphadiazine and streptomycin would be chosen rather than penicillin. Whether organisms were seen in smears or not, cultures should always be attempted. Miss Tolhurst said that it was helpful if the fluid obtained by diagnostic lumbar puncture was sent to the hospital along with the patient, as the bacteriological picture of fluid obtained later would almost certainly be masked by chemotherapy. In very early cases of meningitis, when there were relatively few cells in the cerebro-spinal fluid, no bacteria were seen in smears, and cultural findings might be negative, particularly if chemotherapy had been given for pyrexia. The greatest help was afforded by the leucocyte count. In early cases of purulent meningitis the count was usually considerably raised, while in tuberculous or virus meningitis it was normal or lowered. Chemotherapy was empirical, but should never be delayed in the presence of a possible pyogenic infection.

Miss Tolhurst went on to consider those infections which were usually the surgeon's province. Erysipelas, cellulitis and boils were caused by streptococci and staphylococci, and in general practice usually responded to penicillin. Cultures should always be attempted from infections developing in hospital, as they might be due to penicillin-resistant staphylococci. Cultures should be prepared from collections of pus in abscesses of various kinds if they were accessible. They might at times be so reduced by chemotherapy that incision would be unnecessary. However, chemotherapy did not replace the need to observe general surgical principles, and often failed if drainage was inadequate. Cultures should be attempted of pus found at operation in the peritoneum or thorax, because if complications occurred later in spite of empirical prophylaxis and therapy, the information that had been obtained was often invaluable. It was worth remembering that a patient having prophylaxis or therapy with a particular drug might develop a new infection with organisms resistant to that drug. That was unfortunately not uncommon in hospital. In any case in which chemotherapy had not been given, when pus from any site failed to yield ordinary pyogenic organisms, tubercle bacilli should be looked for as a routine procedure. Any lesion of the skin which had a serous exudate was likely to become infected with staphylococci, streptococci, proteus and other organisms. Culture could be attempted, sensitivity tests made and the appropriate chemotherapy given; but disappointment was sometimes felt because the antibiotics effected improvement rather than cure. The dramatic relief to the patient with acutely infected dermatitis who was treated systemically with the right drug was well worth while; but the dermatitis remained to be treated. A pyogenic infection of the skin might be superimposed on a fungal, tuberculous or syphilitic infection, which was often missed unless it was looked for. Non-specific ulcers, particularly of the legs, were often a circulatory and nutritional rather than a bacteriological problem, and once those factors were corrected the ulcers healed even in the presence of the bacteria.

An important general point was the collection of adequate specimens for examination. Fresh specimens were always an advantage and well worth the effort; but pus twenty-four or forty-eight hours old might often be examined with profit. Pus should be collected in a sterile tube and sent to the laboratory in a quantity of one millilitre or more. Many organisms remained viable for a day or two on special serum-treated swab-sticks, but a minute specimen collected on the previous day on a dry cotton-wool swab was useless.

When there were no facilities for attempting or examining cultures, smears could be used to give some guide to therapy provided that their limitations were realized. Thus meningococci might be recognized in smears of cerebro-spinal fluid or of a petechial rash, but organisms like streptococci and Gram-negative bacilli could not as a rule be fully identified in smears. Organisms of any kind might be too few to be seen in smears, yet would grow in culture. In general, of course, cultures gave much more information than smears.

Miss Tolhurst, in conclusion, said that accurate diagnosis was the first principle of chemotherapy; but for successful chemotherapy the bacteriological picture needed to be carefully related to the lesion and to the clinical findings.

QUESTION 2.—What is the value of determining the antibiotic sensitivity of an organism?

Dr. FUNDER, in reply, said that a consideration of the value of sensitivity tests followed naturally on Miss Tolhurst's comments on the importance of determining the aetiological organism in infections for two reasons. Firstly, sensitivity testing presupposed that the aetiological organism had been determined with a high degree of certainty; secondly, it seemed a logical step to test in the laboratory the sensitivity of the organism in question to a range of antibiotics to guide the clinician in his choice of chemotherapeutic agents. Routine sensitivity testing, however, was obviously impracticable. Further, it was often unnecessary, as many specific infections responded very consistently to antibiotics, and determination of the causative organism was sufficient to indicate the appropriate chemotherapy. Finally, much yet remained to be determined of the correlation between in-vitro sensitivity findings and in-vivo findings—in other words, the clinical response of the patient. For those reasons, routine sensitivity testing obviously could not be advocated.

At the other extreme, the view might be held that if a bacteriological diagnosis had been made on clinical grounds or by laboratory methods, the clinician might rely on his knowledge of the known antibacterial range, the antibacterial spectrum, of the available antibiotics. The newer antibiotics—chloramphenicol, aureomycin and terramycin—were currently referred to as the broad-spectrum antibiotics because of their proved value against a wide range of organisms—Gram-positive and Gram-negative bacteria, rickettsiae and some viruses—and it might be argued that with the wide cover afforded by penicillin, streptomycin and the broad-spectrum antibiotics, sensitivity testing, while of academic interest, from a practical viewpoint was unnecessary. However, there were two objections to that view. Firstly, there was some evidence of mutual antagonism between penicillin and the broad-spectrum antibiotics, and until the position was clarified, caution must be enjoined in the combined use of those antibiotics. Secondly, until the incidence of toxic reactions with the broad-spectrum antibiotics was known more accurately, one might view with misgiving the indiscriminate use of those antibiotics, which might follow that at least partly empirical mode of treatment. Finally, and of greatest importance, with some bacterial species, notably staphylococci and some Gram-negative bacterial species, variation of strains within the species in sensitivity to antibiotics was considerable, and no confident prediction of clinical response could be made.

A reasonable view therefore lay somewhere between those two extremes—just where was to some extent a matter of opinion.

Dr. FUNDER suggested that the principles which determined the desirability or necessity of laboratory sensitivity tests were the following. (i) Certain organisms had been shown to be consistently sensitive to antibiotics—for example, group A streptococci, pneumococci, meningococci and gonococci to penicillin, the typhoid bacillus to chloramphenicol, Brucella and rickettsiae to the broad-spectrum antibiotics. Such diseases might reasonably be treated without laboratory sensitivity tests. In the event of failure to respond, possibly because of inherent insensitivity or inadequate dosage, further bacteriological investigation and in-vitro sensitivity testing would seem indicated. (ii) When the infection was due to staphylococci, streptococci other than group A (such as *Streptococcus viridans* or *Streptococcus faecalis*), or Gram-negative bacilli, laboratory sensitivity tests were of greater importance. When the infection was life-endangering—for example, meningitis, septicemia or bacterial endocarditis—sensitivity tests were essential. Chemotherapy was begun, of course, before the results of sensitivity tests were available; but the therapy was reviewed in the light of those results. In less serious or chronic infections with those organisms, chemotherapy selected according to the known or presumed bacteriological cause seemed reasonable; but in the event of failure of response, one should carry out sensitivity tests early in the management of the case rather than embark on a series of empirical forms of treatment. (iii) In any infection, irrespective of known or presumed bacterial aetiology, in which antibiotic therapy failed to produce the expected result, or when relapse occurred, or when change of bacterial flora was suspected, sensitivity testing with or without further bacteriological investigation should be considered as essential in life-endangering infections and desirable in less severe conditions. (iv) Commenting on the interpretation of laboratory sensitivity tests, at the best in-vitro sensitivity tests were only roughly quantitative, and it was the responsibility of the bacteriologist to advise the clinician of the value and limitations of the technique adopted. Until the more rapid and more easily performed paper disc methods of sensitivity testing were put on a more quantitative basis, it seemed that culture of the organisms in question in tube or plate media with graded concentrations of antibiotics should be carried out, so that a roughly quantitative estimate of in-vitro sensitivity might be made. Given those results, one could not directly predict the clinical response. The distribution of the antibiotic throughout the body, the diffusion of the drug into the lesion—for example, a suppurative focus or the vegetations of endocarditis—had to be taken into account. Often the results of sensitivity tests would act as pointers rather than as clear indications in the choice of chemotherapeutic agents.

QUESTION 3.—How should antibiotics be used in the treatment of acute infections, such as tonsillitis, pneumonia, meningitis and whooping-cough?

Dr. WILLIAMS, in reply, first discussed principles of treatment. He said that a very strong principle of treatment at the present time was that the powdered antibiotics, aureomycin, chloramphenicol and terramycin, might be antagonistic to penicillin. Streptomycin and penicillin were satisfactory combinations, as also were streptomycin and the sulphonamides. Penicillin and the sulphonamides were synergistic. Generally it was best to select one drug.

Turning to the treatment of acute infections, Dr. Williams first discussed acute tonsillitis. He said that an accurate diagnosis should be made clinically and substantiated by examination of a swab. Of cases of acute tonsillitis, 50% were due to group A streptococci and would respond satisfactorily to penicillin. One injection daily for five days of procaine penicillin 300,000 units (on the first day a preparation containing 300,000 units of procaine penicillin and 100,000 units of crystalline penicillin) was advised. An alternative was one injection of a solution containing 300,000 units of procaine penicillin and 100,000 units of crystalline penicillin. Subsequent treatment was with penicillin given daily by mouth in a dose of 200,000 units four-hourly. Similar treatment could be applied to infections which were not dangerous to life, and which would respond

to penicillin, such as boils, *otitis media*, paronychia and cellulitis.

Turning to acute pneumonia, Dr. Williams said that at all ages it was due in the largest percentage of cases to the pneumococcus and would respond best to penicillin. In the first twenty-four hours injections of crystalline penicillin (100,000 to 300,000 units) should be given three-hourly. If there was a good clinical response the injections should be reduced to six-hourly, then twelve-hourly, crystalline penicillin still being used in a dose of 500,000 units for an adult. Procaine penicillin given twelve-hourly could be used in the later stages of treatment, and the twelve-hourly régime was indicated because an effective blood level was obtained for only eighteen hours with procaine penicillin. Referring to the use of "powdered antibiotics" in pneumonia, Dr. Williams said that they were given (i) if there was no response to the use of penicillin in twenty-four hours, (ii) if it was thought at the start that the infection was due to a penicillin-resistant organism, an example of such a condition being pulmonary infection in cystic fibrosis of the pancreas. In the case of a desperately ill child or adult, for whom it was thought that injection treatment was better than oral therapy with a powdered antibiotic, a combination of streptomycin and penicillin given by injection was advocated. An injection of 300,000 units of crystalline penicillin and 100 milligrammes of streptomycin could be given together in the same syringe three-hourly. There was a preparation not yet available in Australia containing penicillin and streptomycin combined in the powdered form, and it would have a place in treatment of pneumonia and other infections when the nature of the organism was in doubt.

Dr. Williams then discussed meningitis. He said that the clinical diagnosis must be supported by immediate help from the bacteriologist. There was considerable controversy about the intrathecal use of penicillin and streptomycin, but it was advised in the first two or three days of treatment. Meningococcal infection was treated with sulphadimidine given by injection and penicillin given by injection. When there was a good response the sulphadimidine could be given by mouth. Penicillin injections were continued in a dose of 300,000 units three-hourly until the patient's condition was much improved, and then the injections were given twelve-hourly. If penicillin was given intrathecally, the dose was 10,000 units daily.

In regard to influenzal meningitis, Dr. Williams said that considerable controversy raged at present on the value of chloramphenicol or aureomycin alone, and the previous form of treatment with streptomycin, antibacterial rabbit serum and sulphadimidine. With due respect to other authorities, he suggested the following procedure: (i) daily intrathecal injections of streptomycin in a dose of 25 to 50 milligrammes for three to five days; (ii) intramuscular injections of streptomycin in a dose of 100 to 250 milligrammes three-hourly for twenty-four hours, then six-hourly; after improvement was noted, the injections should be given twelve-hourly; (iii) chloramphenicol given by mouth in the maximum dose of 50 milligrammes per pound per day; this corresponded to half a capsule six-hourly for an infant and three capsules six-hourly for an adult.

In pneumococcal meningitis large doses of penicillin had produced improved results, and 500,000 to 1,000,000 units of crystalline penicillin given two-hourly by intramuscular injection was the dosage recommended. Sulphadimidine could also be injected intramuscularly and later given by mouth. Penicillin (10,000 units) given intrathecally was not generally advised, but particularly because of its value as demonstrated by the late Sir Hugh Cairns, intrathecal penicillin therapy was advocated in the early stage of treatment.

Dr. Williams finally said that in whooping-cough disappointing results had been obtained, but either chloramphenicol or terramycin should be given in a dose of 100 to 250 milligrammes six-hourly.

QUESTION 4.—How should antibiotics be used in the treatment of septic abortion and puerperal sepsis?

Dr. HILL said that the bacteria most often responsible for puerperal infection in his experience were the anaerobic streptococci (about 80%), *Streptococcus haemolyticus* group A and *Staphylococcus pyogenes* (each less than 5%) and, in lesser proportion, *Bacterium coli*, anaerobic Gram-negative bacilli, haemolytic streptococci of groups other than A, and certain non-haemolytic streptococci such as the *Streptococcus faecalis*. Against all of these bacteria, except *B. coli* and Gram-negative bacilli, penicillin was unquestionably the agent of first choice. Indeed, despite the great advances made in the field of antibiotics in recent years, penicillin was still the most effective antibacterial agent discovered for obstetric use. For mild and moderately severe infections requiring penicillin, the present practice at The Women's Hospital, Melbourne, was to give combined procaine penicillin (300,000 units) and crystalline penicillin (100,000 units) once daily until at least two days after apparent clinical cure. In moderately severe infections due to *Staphylococcus pyogenes*, and in all severe and fulminant infections requiring penicillin, they gave crystalline penicillin every three hours, each dose being of 30,000, 60,000 or 100,000 units, depending on the type and severity of infection. In severe infections due to *Staphylococcus pyogenes* or to resistant haemolytic or anaerobic streptococci, and in all grave infections, the dose was 100,000 units. Higher dosage was reserved for resistant grave infections and infective endocarditis.

Infections due to *B. coli* or anaerobic Gram-negative bacilli were treated with sulphonamides, "Sulphatriad" being used to minimize the dangers of crystalluria and toxic side effects. The average dose in the moderately severe infection was two grammes initially followed by one gramme every four hours until the acute phase of the infection had resolved, and then one gramme every six hours. In severe infections, that dosage level was increased by 50% to 100% until the acute phase was controlled. Alkalis were given, the fluid intake was raised to ensure a urinary output of at least two pints daily, and the red and white blood cell counts were kept at or near normal levels. Only when penicillin and sulphonamides had failed to control infection were other chemotherapeutic agents employed, and the choice of antibiotic then depended on the results of sensitivity tests against the causative bacteria. There the broad-spectrum antibiotics, aureomycin, chloramphenicol and terramycin, had been of particular value. They were indicated in infections due to penicillin-resistant staphylococci or streptococci, or to sulphonamide-resistant *B. coli* or anaerobic Gram-negative bacilli. The dose of aureomycin was 20 to 30 milligrammes per kilogram of body weight daily (for example, two capsules or 500 milligrammes every six hours) for moderately severe infections, and 50 milligrammes per kilogram daily for severe infections. For patients unable to take aureomycin orally, intravenous therapy was available. The dose of chloramphenicol, which could be taken orally only, was approximately twice that of aureomycin. The required terramycin dosage was generally similar to that of aureomycin. In the use of those bacteriostatic antibiotics for severe infections, it was wise not only to maintain full dosage for at least two days after apparent clinical cure, but to continue with half dosage for a further five to seven days. On account of the speed with which bacteria became resistant to it, streptomycin had a limited place in obstetric infections. It had at times, however, been of great value against penicillin-resistant staphylococci and sulphonamide-resistant *B. coli*. The dose was 0.5 to 1.0 gramme two or three times daily depending on the severity of infection, and if response was not definite within three days it was a waste of time continuing therapy. The invaluable place of antibacterial agents in the prevention of infection to both mother and baby before delivery should be noted. The chief indications for their use were (i) long-standing rupture of the membranes, (ii) prolonged labour, (iii) the presence of a vaginal discharge, or (iv) contemplated surgery. Whenever possible, investigation of the vaginal flora should precede and determine the nature of the

therapy; but if that was impracticable a combined penicillin and sulphonamide "cover" should be instituted and maintained over the requisite period.

Dr. Hill then enumerated the following principles, which he said it was wise to follow in the treatment of puerperal infection. (i) The patient's blood volume and haemoglobin concentration should be restored to normal levels as a first step. Blood was a more common immediate requirement than antibiotics, and its early and adequate use would reduce, and at times eliminate, the need for chemotherapy. (ii) When facilities were available, a bacteriological diagnosis should be made as a basis for therapy. In serious infections, combined penicillin and sulphonamide therapy should begin as soon as vaginal swabs had been taken for smear and cultural examinations, and adjustment of therapy could await the return of the bacteriological findings. (iii) A large initial dose of the agent chosen should be given, a high level should be maintained throughout, and therapy should be continued until at least two days after the infection appeared to have been controlled. (iv) At the same time, the patient should not be treated for longer than was really necessary. Too prolonged treatment increased the dangers of bacterial resistance and of seriously upsetting the patient's normal bacterial balance. Thus a resistant Gram-negative bacillary infection might follow continued use of penicillin in a cured Gram-positive coccal infection. (v) If definite clinical improvement was not apparent in two or three days, the value of therapy with the agent and the dosage used should be questioned. (vi) The broad-spectrum antibiotics should not be used at the same time as other antibacterial agents such as penicillin. On the other hand, penicillin, streptomycin and sulphonamides, when indicated, could with advantage be used in combination. (vii) At all costs the common dangers of indiscriminate therapy and inadequate dosage should be avoided. They had been the main contributors to the deaths of patients admitted to hospital after treatment outside.

Dr. Hill then discussed abortional infections which he said differed from puerperal infections in two main particulars. Firstly, owing to the frequency with which abortion was the result of criminal interference, the relative incidence of infection with faecal contaminants was approximately 20% higher than in puerperal infections. Most important of those contaminants was *Clostridium welchii*, which was still the commonest cause of death in infections following abortion. Secondly, an essential part of the treatment of most complicated abortions was uterine curettage, and the sooner that could be accomplished with safety the better the outlook, particularly in infection due to anaerobes. The need for uterine curettage and the treatment of *Cl. welchii* infections were thus the two major additions to be considered in the treatment of abortional infections. The grave *Cl. welchii* infections, of which the two chief types might be described as haemolytic and toxic, required the following urgent concurrent measures: administration of antitoxin and antibiotics, treatment of shock, emptying of the uterus, alkalization of the urine, replacement of blood lost and, in haemolytic infections, management of renal failure. In addition to the intravenous and intramuscular administration of antitoxin totalling 100,000 units every eight to twelve hours for one and a half to two days, 100,000 units of crystalline penicillin were given every three hours. In less serious infections, doses of 60,000 units were often sufficient. Penicillin was unreservedly the antibiotic of choice, and against the strain which produced uterine gangrene it had a remarkable specificity. Without antitoxin, however, the gravest cases would end in death. Curettage for infection following abortion must be performed only when the patient had recovered from shock, was already under a chemotherapeutic "cover", and sufficient blood was available and ready to run, to restore her blood volume and haemoglobin concentration to normal, and to make good whatever loss might occur during curettage. Although a considerably higher proportion of patients with abortional infection reached hospital in a serious clinical state and with extrauterine spread than was the case with puerperal infection, the principles of chemo-

therapy did not differ in any way from those already laid down.

QUESTION 5.—Should antibiotics be used in surgical practice as prophylactics to prevent infection?

QUESTION 6.—How are antibiotics used to treat infection in surgical cases?

DR. LEE, in reply, said that there was no doubt that in the years since the introduction of antibiotics into surgical practice, there had been a great reduction in the mortality of many surgical operations, and some at least of that improvement in results could be credited to their use. At the outset it could not be stressed too strongly that the function of antibiotics was the inhibition of growth or destruction of sensitive bacteria, and their use had no rational place in the treatment of non-bacterial inflammation. Since the sensitivity of bacteria to the various antibiotics varied greatly, the first step in their scientific use was the determination of the nature of the organisms to be attacked. It was now a commonplace in advanced medical centres that the bacteriologist furnished a report not only of the nature of the organisms, but also of their in-vitro sensitivity to common antibiotics.

Dr. Lee went on to say that though sulphonamides were not strictly antibiotics, their combination with true antibiotics sometimes exerted a greater effect than either used singly. Conversely, certain other combinations were less useful than their single effect. Thus the action of penicillin was commonly enhanced by the simultaneous use of sulphonamides, especially sulphadiazine; penicillin and streptomycin together were better than either singly, as also were streptomycin and aureomycin. But the combination of penicillin with aureomycin, terramycin or chloramphenicol diminished the activity of the individual agent. Although much fear had been expressed about the development of resistant strains of organisms, actually such resistance had been demonstrated only against streptomycin, and in the case of certain staphylococci, against penicillin. Dr. Lee said that until the appearance of Dr. Edgar Thomson's recent article he had not been aware that resistant strains of organisms had been found in relation to other antibiotics. American opinion at least regarded the problem as mainly related to streptomycin, and to the staphylococci and penicillin.

Referring to the prophylactic use of antibiotics, Dr. Lee said that there was a widespread feeling at present amongst authorities that antibiotics should not be used prophylactically in clean surgical operations, nor in any general attempt to prevent post-operative lung complications. Although while those substances were expensive and in short supply there might be much to recommend that advice, it was doubtful whether it was sound. Since contamination was always possible, there was little doubt that a series of patients treated prophylactically with penicillin would show less post-operative morbidity than a group not so treated. If in the future, as was quite probable, an antibiotic pill could be devised which exercised a powerful prophylactic effect against bacterial infection, no consideration of cost or shortage of supplies was likely to prevent its general use by surgeons or its strong demand by patients. Till that stage was reached, the present position of the prophylactic use of antibiotics was somewhat as follows. For contaminated lacerated wounds, penicillin should be given in treatment dosage. For extraction of teeth and ear, nose and throat surgery, the use was limited to the group of patients with rheumatic or congenital heart disease, who should be given penicillin or aureomycin. In chest operations, 100,000 units of penicillin should be given six-hourly, and 0.5 gramme of streptomycin twelve-hourly, on two pre-operative days, and for the first two or three days after operation. Penicillin, 100,000 units, and 1.0 gramme of streptomycin in 30 millilitres of normal saline were instilled into the thoracic cavity at the completion of the operation. For resection of the oesophagus, streptomycin (0.25 gramme four times daily) was used as a gargle, which was swallowed, for two days before operation. Penicillin (100,000 units six-hourly) was given from the morning of operation. In partial gastrectomy for cancer,

the treatment was the same as for oesophageal resection. For ulcer, 200,000 units of penicillin in 30 millilitres of normal saline were given into the left subphrenic space, and abdominal incision was carried out. Then penicillin was given, 100,000 units six-hourly. For colon surgery terramycin was given to a total of 3.0 grammes in divided doses for the three immediate post-operative days. Aureomycin was almost equally effective, and both almost sterilized the colonic contents. In rectal surgery no antibiotic treatment might be given; on the other hand, the same treatment as for colon surgery could be given, or succinylsulphathiazole for four to five days before operation.

Dr. Lee then discussed antibiotics in treatment. He said that in the most general terms, penicillin and soluble sulphonamides were indicated for suppurative lesions, streptomycin and aureomycin or terramycin where bowel organisms were concerned. Though the insoluble sulphonamides had a place in the sterilization of colonic contents, when the gut wall was inflamed, as in entero-colitis, a soluble sulphonamide which would act through the bloodstream was necessary. It was well established that there was an optimum dosage for antibiotics used in treatment. The main bacteriostatic effect was exercised on multiplying organisms, and it might ultimately prove, as had already been shown with streptomycin in tuberculosis, that a massive "punch" at considerable intervals was better than a continuous effect. However, the present viewpoint was that in acute infections a continuous effect should be obtained. When penicillin was used against sensitive organisms, the following represented the optimum intramuscular dosage: 25,000 units every three hours, 50,000 units every four hours, 100,000 units every six hours, 250,000 units every eight hours, 500,000 units every twelve hours. Dr. Lee said that from his own experience he was not at all happy about the oily solutions, which were difficult to handle and often distinctly painful after injection. When sterile "Novocain" solutions were available, he knew of no method of giving penicillin so comfortable as its injection in 1% "Novocain" solution. The injection of such material was quite painless. The average dose of streptomycin or dihydrostreptomycin was 0.5 gramme twice daily, and its use should not be continued beyond five to seven days. If aureomycin, terramycin or chloramphenicol were used, 2.0 grammes were given in the first twenty-four hours and 1.0 gramme on each successive day.

Dr. Lee said that basically the treatment of bacterial disease by antibiotics consisted in the recognition of the organism to be attacked, and the use of the correct antibiotic, singly or in combination, at the optimum dosage, for an adequate time. To that rule there were certain significant exceptions. Thus in gas gangrene penicillin should be given in ten times the normal dosage, together with sulphadiazine. In acute osteomyelitis, penicillin and sulphadiazine should be given in optimum dosage; but if there was not a rapid improvement, terramycin should be added, especially if the culture showed penicillin-resistant organisms. In peritonitis, aureomycin and dihydrostreptomycin appeared to be the antibiotics of choice. The aureomycin at least for the first day or two might be administered intravenously. It was probable that from the results obtained in colon surgery, terramycin would be at least as effective. In skin infections, such as carbuncle, penicillin usually produced rapid improvement. But because of the increasing number of penicillin-resistant staphylococci, it was well to consider the use of aureomycin or terramycin for those patients who did not respond within forty-eight hours. For infections of the genitourinary tract, 0.5 gramme of sulphadiazine given three times daily, with 300,000 units of procaine penicillin daily, would control most infections of the urinary tract. In infections caused by Gram-negative bacilli, aureomycin or terramycin would appear to be the drug of choice. No matter what antibiotics were used, there was rarely much result if a foreign body or obstruction was present in the urinary tract.

Referring to local treatment with antibiotics, Dr. Lee said that in contrast with the sulphonamides, in which local application was associated with such a high development of

sensitivity to subsequent use that such a method was unjustifiable, there was a wide field of usefulness for locally applied antibiotics. Since the strength of the antibiotic in contact with the organism was an important consideration, it would seem rational to make local application as often as possible. Such methods included the use of penicillin cream as an application to burns, and of penicillin solution or powder to possibly contaminated wounds, to skin-grafted areas, or when foreign bodies were inserted in a wound. Coppleson had recently reported successful use of chloramphenicol powder in suppurative lesions, stating that if contact with the infected surface could be obtained, virtual sterilization occurred within forty-eight hours. Since chloramphenicol was more readily obtainable in Australia than some other antibiotics, such an extension of its use should be welcomed, especially since American authorities would give that substance a very limited place in therapy, practically confined to the treatment of typhoid fever and certain viral diseases.

Miss Tolhurst spoke again. She said that while topical applications had a definite place in chemotherapy, she did not altogether agree with Dr. Lee that they should be used as often as possible. In the first place they tended to suppress an infection without completely eradicating the organism. That was why, apart from the local irritation often caused, the practice of using penicillin lozenges for streptococcal throats had been given up. The same thing happened in many skin infections, and relapse often occurred when therapy was withdrawn. Secondly, local applications, particularly over a long period, must lead to the emergence of resistant organisms. That meant that should be patient develop a serious infection requiring systemic therapy (and it did happen), the drug that had been used locally was useless. Such resistant strains would, of course, be spread in the community, particularly in hospitals. Thirdly, antibiotics applied to the skin were sensitizing agents, and while there were as yet only a few published reports of sensitization with the newer antibiotics, it seemed likely that with greater availability of those drugs there would be more. Thus a sensitized patient might have to be deprived later of a life-saving antibiotic. Topical applications to burns for prophylaxis (for example, penicillin and polymyxin) had been advocated on the grounds that devitalized tissue was not affected by systemic therapy. One of the great difficulties, of course, was to apply lotions or creams adequately, and it seemed a better principle to use systemic prophylaxis so that the tissues contained the drug and could not be easily invaded, and to add local applications only when they were really indicated.

Miss Tolhurst, in conclusion, said that topical chemotherapy was invaluable in certain conditions where the blood supply was poor, as in the eye; but in her opinion it should be reserved for such conditions.

QUESTION 7.—How are antibiotics used in the treatment of typhus fever, typhoid fever and brucellosis?

Dr. FUNDER said that the discovery of the broad-spectrum antibiotics—chloramphenicol, aureomycin and terramycin—had completely altered the treatment, severity and mortality rate of the typhus group and other diseases caused by rickettsiae. While rickettsial diseases were of relatively infrequent occurrence in Australia, members of the group which might be encountered were murine typhus, "Q" fever, scrub typhus and possibly North Queensland tick typhus. It was possible also that with the increasing proportion of European immigrants in Australia, occasional sporadic cases of louse-borne epidemic typhus might be encountered. In "Q" fever a daily dosage of two or three grammes, with or without an initial loading dose of two or three grammes, was given for four or five days after defervescence, which usually occurred within seventy-two hours from the beginning of treatment. In these rickettsial diseases, the three broad-spectrum antibiotics appeared to be of approximately equal efficacy, although terramycin had not been explored as fully as the other two. In the treatment of typhoid fever, the equal efficacy of the three antibiotics no longer held, chloramphenicol being far superior to the other two (which had been shown, however, to exert a favourable

influence on the course of the disease). Special features of the use of chloramphenicol in typhoid fever were: (i) the need for a longer course of treatment and a greater total dosage than in the rickettsial diseases, and (ii) the lag of two or three days after the institution of therapy before a clinical response was manifest. The recommended dosage was an initial dose of 50 milligrammes per kilogram of body weight (3.5 to 4.0 grammes for an average adult), followed by three grammes daily in four divided doses until the temperature was normal. Thereafter, two grammes daily were given in four divided doses for a total period of twelve to fourteen days. Under such a dosage régime, within seventy-two hours there was almost invariably rapid subjective and objective clinical improvement. If a relapse occurred, three grammes were given daily for five to seven days or longer according to the response of the patient. Good evidence had been presented in small trials in America by Smadel and Woodward and colleagues that a more prompt response followed combined therapy with chloramphenicol and cortisone than with chloramphenicol alone. Cortisone had been shown to have no direct effect on the typhoid bacillus, so it was assumed that its therapeutic value lay in its ability to assist the response of the host. The precise value and possible dangers of cortisone in the treatment of typhoid fever remained to be determined, and meanwhile chloramphenicol constituted the basic chemotherapeutic agent.

Dr. Funder went on to say that in brucella infections—presenting as an acute febrile illness or as a chronic or relapsing infection, undulant fever—there was still some doubt as to the best form of chemotherapy. The broad-spectrum antibiotics were of considerable and approximately equal value, and any one of them gave better results than the previous mode of treatment, a combination of streptomycin and sulphadiazine. A satisfactory response almost always occurred, but relapses frequently followed after varying (often long) intervals. The relapses usually had benefited by a further course of chemotherapy. The main interest at present lay in chemotherapeutic régimes which would reduce the incidence of relapses. Greatly improved results had been claimed by Mayo Clinic workers by the combined use of aureomycin and streptomycin. Woodward and his colleagues in America had in progress a trial in which initial treatment was given with chloramphenicol and the patient returned every three months, even if symptomatically well, for a two-day or three-day course of chloramphenicol. The value of that method of management remained to be determined. The treatment at present was the administration of aureomycin, chloramphenicol or terramycin for a period of approximately fourteen days. Shorter courses of treatment had been associated with higher relapse rates. In the larger reported trials, mostly American, the dosage employed had varied, but was of the order of three grammes daily distributed over two to four oral doses. Streptomycin, if used, was recommended in a daily dose of two grammes (two half-daily doses of one gramme) for the treatment period of fourteen days. Finally, in the more acute forms of brucellosis, a Herxheimer type of reaction might follow antibiotic therapy. The value in the prevention of such reactions of small initial dosage with gradual increase to full dosage remained to be determined.

QUESTION 8.—How should antibiotics be used in the treatment of infections of the urinary tract?

QUESTION 9.—What are the accepted methods of antibiotic treatment of syphilis and gonorrhoea?

DR. HILL said that in the treatment of urinary tract infections the following points should be borne in mind: (i) Urinary tract infections were caused by a wide variety of bacteria, those most commonly responsible being the Gram-negative bacilli, in particular *Bacterium coli* and paracolon bacilli, less often *Pseudomonas pyocyanea*, *Proteus vulgaris* and *Klebsiella pneumoniae* (Friedländer). The Gram-positive bacteria most often responsible were *Staphylococcus pyogenes* and certain streptococci, such as the *Streptococcus faecalis*. (ii) Individual infections were often due to two or more infecting agents. (iii) During

antibiotic therapy, bacteria originally held responsible for the infection might disappear, to be replaced by bacteria not previously isolated. That might represent the emergence of bacteria dominated in the original cultures, or added infection due to catheterization or urological procedures. (iv) From the foregoing it was clear that for effective management bacteriological investigations should be performed before and, particularly in chronic and resistant infections, periodically throughout the treatment period. Further, they should be combined with sensitivity tests to determine the most suitable therapeutic agent for each bacterial type isolated. (v) Even with correct chemotherapy, cure could not be expected in the presence of persistent obstruction in the urinary tract, whether due to stricture, stone, tumour or other lesion.

Dr. Hill then went on to consider the role of the different chemotherapeutic agents. Referring first to the sulphonamides, he said that they were effective in the majority of *B. coli* infections and against group A haemolytic streptococci and occasional strains of Gram-negative bacilli and staphylococci. The urine should be made alkaline and the fluid intake should be sufficient to maintain a urinary output of at least two pints daily. Sulphadiazine alone was a satisfactory compound, but it was common practice at present to prescribe "Sulphatriad"—a combination of sulphadiazine, sulphamerazine and one other sulphonamide such as sulphamezathine, to minimize the dangers of crystalluria. The usual dose was two grammes given initially, followed by one gramme every four to six hours for two days, then one gramme three times daily, the course lasting seven to ten days for acute infections, and longer in chronic and resistant cases. Should sulphonamides be required in the presence of impaired renal function, sulphacetamide was the logical choice because of its great solubility.

Speaking of penicillin, Dr. Hill said that it was indicated in urinary tract infections due to streptococci, staphylococci and other Gram-positive bacteria, and in combination with sulphonamides had been most effective against mixed infections due to Gram-positive and Gram-negative bacteria. The recommended dose was 30,000 units or more given intramuscularly every three hours, or 300,000 units of procaine penicillin, with or without 100,000 units of crystalline penicillin, every twelve to twenty-four hours. In severe infections, and against such bacteria as *Streptococcus faecalis*, *Bacillus proteus* and many of the staphylococci, considerably larger doses and three-hourly administration would be necessary.

Dr. Hill, referring next to streptomycin, said that although the majority of urinary tract infections were caused by Gram-negative bacteria, many of which were streptomycin-sensitive, streptomycin had not been of the value hoped in those infections. That was due chiefly to the speed with which bacteria became resistant to it, less to its toxicity. The likelihood of bacterial resistance was lessened if obstructive lesions in the urinary tract were corrected and the urine was made alkaline before treatment was commenced. The fluid intake should be restricted to four pints daily to keep the antibiotic concentration at a high level. In susceptible infections, streptomycin would often sterilize the urine in two to three days, and a daily dose of one gramme was usually sufficient. Bacterial resistance might, however, develop within forty-eight to seventy-two hours of the commencement of therapy, and then neither increased dosage nor substitution of dihydrostreptomycin would be of any avail. Against moderately resistant bacteria larger doses were necessary, and for *P. pyocyanea* infections three grammes given daily for three days had been suggested. In enterococcal infections the combination of penicillin and streptomycin had proved effective.

Dr. Hill then discussed the broad-spectrum antibiotics—*aureomycin*, chloramphenicol and terramycin. He said that because of their wide range of activity against both Gram-positive and Gram-negative bacteria, they had proved of great value in urinary infections. They were all administered orally, were relatively non-toxic, and did not often give rise to resistant variants. While they had many similarities they also had significant differences, and the choice of compound should rest on the results of sensitivity

tests. The present view was that each compound should be used alone, and that the combination of any one of them with penicillin was mutually disadvantageous. Aureomycin had been used with success in urinary infections which had failed to respond to sulphonamides, penicillin and streptomycin; examples were infections with resistant strains of *B. coli* or faecal streptococci. *Proteus vulgaris* and *P. pyocyanea*, however, were very likely to prove resistant. Unlike streptomycin, aureomycin was most active in an acid medium. Its dose should be not less than two milligrammes per kilogram daily, or 500 milligrammes every six hours for the average adult. Therapy should be continued for at least five to seven days after apparent clinical cure, or until the bacteria had disappeared from the urine. Chloramphenicol was readily available and relatively inexpensive, but in his experience it had not been as generally helpful as aureomycin. It might, however, be of value in infections which had not responded to aureomycin, examples being infections due to *Pseudomonas pyocyanea* and *Proteus vulgaris*. A recommended dosage was four to six grammes daily, given in divided amounts at intervals of four to six hours for five to seven days; it was suggested that the dosage should then be reduced to 0.25 gramme four times daily and continued until a further five to seven days after the principal bacteria had disappeared from the urine. Terramycin, the latest of the broad-spectrum antibiotics, was one of the most valuable in urinary infections. It had been used with success in infections due to resistant *B. coli*, *Str. faecalis*, *Staph. pyogenes* and *P. pyocyanea*. A dose of two grammes daily for five days, followed by one gramme daily for a further five days, was generally sufficient to produce a prompt and effective response against susceptible bacteria.

Dr. Hill then discussed the treatment of gonorrhoea and syphilis. He said that penicillin had revolutionized the control and treatment of both gonorrhoea and syphilis. In the treatment of gonorrhoea, penicillin was still by far the agent of choice. It acted swiftly, was relatively non-toxic, and had proved completely successful in thousands of cases. Gonococci were amongst the most sensitive of all bacteria to penicillin, and the development of resistant strains was almost unheard of. Apparent failure of penicillin therapy was thus rarely, if ever, due to true penicillin resistance, but might be due to insufficient dosage, to structural defect such as a stricture or walled-off abscess, or, most commonly, to reinfection. After a single intramuscular injection of 50,000 to 100,000 units of penicillin in acute infection, gonococci disappeared from the urethra in about four to six hours, cultural findings became negative shortly afterwards, and the patient underwent a rapid symptomatic improvement. Cure would follow the intramuscular injection every three hours of 10,000 units for 16 doses, or of 30,000 units for five doses; but the usual modern method was simply to give one injection of 300,000 units of procaine penicillin. At The Women's Hospital, Melbourne, that same injection was given daily for three days. The patient returned for observation one, two and three weeks after treatment. For chronic gonorrhoea, or when pelvic structures were involved, the penicillin dosage was 30,000 units every three hours for five days, or 500,000 to 1,000,000 units daily for three days or longer, depending on the response. Should surgical treatment be necessary, it was carried out under a penicillin cover. Because of the treponemocidal action of penicillin, it was important, before penicillin therapy was started, to examine every patient thoroughly for signs of syphilis, and should suggestive signs be present, to defer treatment until a definite diagnosis was made. A pronounced febrile or Herxheimer reaction occurring during treatment would at once arouse suspicion of syphilis, and such a patient should be observed for several months. The criterion for cure of gonorrhoea was the obtaining of at least three consecutive negative results from smear and cultural examinations and complete absence of urethral discharge. All patients should be examined and have serological tests performed after three and six months for evidence of concomitant syphilis. Although streptomycin and the broad-spectrum antibiotics had also proved effective against gonorrhoea, their place

at present was reasonably restricted to infections in which penicillin was either ineffective or contraindicated.

Dr. Hill then discussed the treatment of syphilis. He said that penicillin therapy had introduced a new age into the prognosis and management of syphilitic infection. After a single injection of 25,000 units of penicillin in early acute syphilis, the treponema disappeared from the primary lesion within sixteen hours. With continued successful treatment the serological tests might show a return to normal in a few weeks. At The Women's Hospital syphilitic patients received at least two courses of treatment in the following way: (i) Penicillin, 50,000 units every three hours, was given for twelve days, or 200,000 units three times daily for twelve days. In the treatment of the pregnant syphilitic, the course was given, if possible, before the fourth month of pregnancy. In the congenital syphilitic woman, the first course was extended by the administration of 600,000 units of procaine penicillin daily until a total of 10,000,000 to 12,000,000 units had been given. (ii) Procaine penicillin, 600,000 units, was given for eight days. This second course was given three months later, or, in the case of the pregnant syphilitic, at the eighth month of pregnancy. In the treatment of the congenital syphilitic, this course was extended to twelve days. If the syphilitic mother had completed both courses before delivery, her baby did not receive routine antisyphilitic treatment. Its Wassermann titre was noted at least monthly, however, and at the first rise of titre the baby received a ten days' course of procaine penicillin. For babies born prematurely the daily dose was 100,000 units, for babies born at term 150,000 units. Should a syphilitic mother fail to complete her second course of treatment before delivery, her baby was given antisyphilitic treatment.

Dr. Hill went on to say that in 1951 Curtis *et alii* had reported that the preparation of choice was procaine penicillin in oil with aluminium monostearate (2%). They recommended total doses of between 5,000,000 and 12,000,000 units, administered in courses lasting from eight days to ten weeks. Some American observers reported that about half of the patients treated with penicillin showed a Herxheimer reaction in the first twenty-four hours, with sudden high fever, joint and muscular pains, and an exacerbation of mucous membrane or cutaneous lesions. Such a reaction was very rare in his experience.

Dr. Hill finally said that with the treatment schedules outlined, the failure rate after one year was said to be less than 10%. If relapse occurred, the penicillin course was repeated; after a second relapse heavy metal therapy was combined with penicillin. All patients treated with penicillin should be examined for signs of relapse every month for the first year and every three months for the second year, and should have serological tests performed annually thereafter. A complete cerebro-spinal fluid examination should be made six to twelve months after treatment and repeated in two and three years.

QUESTION 10.—What are the toxic effects of antibiotics?

DR. FUNDEE, in reply, said that the most important and commonest toxic effect with penicillin was the production of allergic manifestations. Sensitivity reactions occurred with crystalline penicillin of the highest purity, and certainly were due to the penicillin itself, and not to traces of impurities. Sensitivity reactions occurred most frequently in subjects who had had previous penicillin therapy, but might occur in subjects who had had no known previous contact with the drug. It was estimated that 3% to 6% of patients were sensitive to crystalline penicillin, though the dosage required to elicit allergy and the severity of the manifestations varied greatly. The commonest allergic manifestation was urticaria; contact dermatitis and a serum-sickness type of reaction also occurred. Reactions occurred after parenteral, oral or topical application, and were probably most frequent after topical application. With the increasing use of penicillin, there had been a gradual increase in the frequency of reactions, and perhaps for that reason topical application should be undertaken with caution. In primary and perhaps

secondary syphilis and in neurosyphilis a Herxheimer reaction frequently followed penicillin therapy. Such reactions appeared to be infrequent in cardio-vascular syphilis. Initial small dosage with gradual increase to full dosage had been shown to be ineffective in reducing the frequency or severity of Herxheimer reactions, which were in no way a practical contraindication to penicillin treatment. Finally, after oral topical therapy by lozenges or spraying, stomatitis and black discoloration of the tongue occasionally occurred.

Dr. Funder then said that with streptomycin prolonged administration or high dosage over a shorter interval produced in a proportion of patient damage to the eighth nerve. Vestibular function was affected more commonly than hearing. Tests of vestibular function had shown that the structural impairment was usually permanent, though most patients appeared to achieve satisfactory vestibular function by compensatory mechanisms. It was hoped from early trials that dihydrostreptomycin would prove less neurotoxic than streptomycin. However, it had been found that it was more likely to produce some degree of permanent deafness than was streptomycin, and probably streptomycin was to be preferred for long-continued administration. No precise statement could be made on the incidence of neurotoxicity in relation to dosage schedules. With daily doses of three grammes, neurotoxic effects might appear within a week or two; daily doses of one gramme had been given for forty to ninety days with a relatively low incidence of toxicity (vestibular dysfunction in about 5% of patients). Allergic manifestations also occurred in the form of skin rashes and urticaria. Though treatment often might be continued despite those manifestations, reports of severe reactions enjoined caution in the management of such conditions. Also, several reports had been made of contact dermatitis in nurses giving repeated injections of streptomycin.

Referring to the broad-spectrum antibiotics—chloramphenicol, aureomycin and terramycin—Dr. Funder said that the most common side-effects were gastro-intestinal symptoms. Nausea, heartburn, epigastric distress and vomiting occurred in a proportion of patients with all three. A more serious side effect was diarrhoea, often associated with *pruritus ani*, which might persist for a considerable time after treatment had stopped. That effect was seen more commonly with aureomycin and terramycin than with chloramphenicol, and possibly was due to the more profound effect of the first-named on the bowel flora. Culture of the faeces of patients receiving aureomycin or terramycin who had diarrhoea often showed a great predominance of acid-producing yeasts or yeast-like organisms. A further aspect of the change of bacterial flora caused by those antibiotics was that if the change of flora occurred—for example, in a pulmonary abscess or bronchiectatic cavity—a monilial infection might develop, and fatal cases of pulmonary moniliasis following therapy with the broad-spectrum antibiotics had been reported. Finally, there had recently been considerable interest in cases of bone marrow depression associated with chloramphenicol therapy. A number of fatal cases of aplastic anaemia attributed to the drug had been reported in the last year or so, and a larger number of cases of depression of marrow function with recovery after discontinuance of treatment with the drug were on record. Most of the cases had followed prolonged continuous or intermittent therapy. All the marrow elements—red cells, granulocytes and platelets—might be involved in the depression of function. It had been estimated that the incidence of serious blood disorders following chloramphenicol therapy was of the order of one in 400,000 cases, obviously an extremely low frequency. Further evidence was needed before the impact of those findings on the general value of chloramphenicol or the desirability of periodic blood examinations during chemotherapy could be assessed.

QUESTION 11.—What are the reasons for failure in chemotherapy?

Miss Tolhurst, in reply, said the first reason was inaccurate diagnosis leading to use of the wrong anti-

biotic. It was necessary constantly to remind oneself that a clinical entity was not necessarily a bacteriological entity, and that cultures should be made before therapy was begun, so that the bacteriological picture was not obscured. The second reason was late diagnosis. If a patient already had overwhelming toxæmia or a very extensive lesion, chemotherapy was less likely to succeed although it should always be tried. When a patient had what appeared to be a fulminating infection, every minute's delay in instituting massive chemotherapy was serious. The third reason was inadequate dosage with failure to penetrate the lesion in sufficient concentration. Thus much higher doses were required in meningitis than in pneumonia. Other reasons were an increase in the resistance of the infecting organism during treatment or a change in the bacteriological picture—in other words, a new infection—or the presence of an underlying infection such as tuberculosis or of an associated lesion such as dermatitis. Finally, chemotherapy sometimes failed through neglect of supportive treatment. That should include the observance of general surgical principles such as adequate drainage and the removal of obstructions, and the maintenance of nutrition and especially of the hæmoglobin value. Each patient presented an individual problem in chemotherapy, which still required that he be considered as a whole.

Dr. Thomson, from the chair, said that there were some points arising from the answers to the various questions which should be emphasized. Adequate laboratory control was necessary as a guide to treatment after consultation between the bacteriologist and the clinician concerned. Laboratory control could be carried out in any laboratory in which culture methods were available, and in which there was someone trained in the identification of micro-organisms. There was no doubt that antibiotic-resistant strains of organisms occurred. The problem of resistant strains was of special importance in relation to the *Staphylococcus pyogenes*, and was chiefly a hospital problem; there it was complicated by "cross-infection" to a serious extent. The correlation between laboratory findings and clinical responses was not always parallel for reasons which had been given; but the final assessment was the clinical response of the patient. It was difficult to dogmatize as to dosage; but the basic dosages indicated in the discussion were supplied as a base line. Any variation should be related to the base line dose. It was fully realized by the members of the panel that adequate laboratory facilities were not always available to the general practitioner, who might, therefore, have to administer antibiotics "on the blind"; in those circumstances, the best results would probably be obtained by following the guide to the use of antibiotics published in *THE MEDICAL JOURNAL OF AUSTRALIA* of June 7, 1952, at page 798.

Dr. Thomson said that antibiotics were being misused at times by all grades of practitioners and even in the teaching hospitals. It was well to remember that antibiotics should not replace the application of the general basic principles of surgical technique and asepsis, and that antibiotics should not be used as universal antipyretics.

A REVIEW OF POLIOMYELITIS.

A PLENARY SESSION was held on the subject of "A Review of Poliomyelitis". The chairman was D. M. McWhae (Western Australia).

The New Laboratory Approach to Poliomyelitis.

SIR MACFARLANE BURNET (Victoria) said that in the last two years a wholly new and powerful laboratory approach to poliomyelitis had arisen in the form of tissue culture, and it seemed that a much clearer picture of the epidemiology of poliomyelitis and a practical method of immunization would emerge from the work. He referred to the three serological types of virus, Brunhilde, Lansing and Leon, and said that most viruses isolated from paralytic patients were of Brunhilde type. The poliomyelitis virus seemed to be a strictly human parasite. The site of multi-

plication in its normal cycle was in cells in direct association with the lumen of the alimentary tract; there it lodged after being taken in by mouth, and newly generated virus passed into the faeces and thence into the environment. Multiplication occurred freely only in a previously uninfected person. For a few weeks the virus continued to multiply, to infect other cells and to be excreted in the faeces. Then antibodies were produced, the infection was eliminated, and the subject was no longer susceptible to virus of that type. During epidemics large amounts of virus passed into sewage. Fresh susceptible children were probably infected mainly by indirect faecal transfer, especially by way of fingers. Transfer occurred most readily in the warm months of the year.

Sir Macfarlane Burnet stressed that paralysis played no necessary part in the life story of the poliomyelitis virus. It passed normally through a community as an invisible epidemic. However, Brunhilde virus (perhaps also Leon, but rarely, if ever, Lansing) was prone to appear in a more invasive form and pass to the central nervous system. The mode of passage was in dispute. The result, depending on many factors, ranged from wholly non-paralytic infection to rapidly spreading fatal paralysis. One host factor was age: the most severe cases occurred in young adults; least harm resulted in infancy.

Discussing prevention of paralytic disease, Sir Macfarlane Burnet said that infection had to be accepted as sooner or later inevitable; therefore it was necessary to minimize its effect. Possible ways of doing that were (i) to ensure infection and immunization in infancy, (ii) to provide an effective and safe means of immunization in infancy, (iii) to protect children during epidemics from predisposing factors such as tonsillectomy, pertussis immunization and over-exertion, and (iv) to breed a genetically insusceptible race. Sir Macfarlane Burnet discussed only the possibility of immunization, which might be provided by administration of living virus rendered safe in one or other fashion or of killed virus. With modern tissue culture methods the way was open, theoretically at least, for production of a satisfactory killed virus vaccine which would confer a significant degree of immunity against entry of virus into the blood and its passage to the central nervous system; it was doubtful, however, whether the protection would last long enough. There were strains of virus in existence which theoretically at least might be used, as living virus, for immunization of infants without modification, but no responsible virologist would use them in the present state of knowledge. The following was one reading of the situation: (i) the only type of immunization likely to be successful was with living virus, reaching the normal site of infection in the bowel but not invading the central nervous system; (ii) the procedure could be tested only in children—with attendant risks; (iii) the current problem was to develop a safe and practical method of immunization with live virus without submitting children to a risk of paralysis greater than the present natural risk; (iv) either passive immunization with γ globulin or active immunization with killed virus could probably give temporary protection against paralysis during an epidemic; (v) if, as was likely, γ globulin could be shown to give protection against paralysis but not interfere with production of active immunity, the way would be open to give living virus to infants experimentally under cover of a protective dose of γ globulin. Sir Macfarlane Burnet said that whatever method was developed, the actual antigenic materials would be produced by the tissue culture technique. The new techniques provided not only a means of growing the virus, but also methods of estimating the amount and determining the immunological type of a virus; a laboratory means of determining invasiveness of a given strain was still lacking. Sir Macfarlane Burnet said in conclusion that he strongly believed that a means of preventing poliomyelitis was in sight that might in twenty years attain the same success as had resulted from diphtheria immunization.

Some Epidemiological and Public Health Aspects of Poliomyelitis.

R. V. Southcott (South Australia) discussed the epidemiological and public health aspects of poliomyelitis.

He reviewed the history of the epidemiological features of the disease, discussing the increasing size of epidemics and the changing age incidence. Dr. Southcott said that he believed that the bulk of the disease was spread by contact, via droplets, although the number of non-paralytic cases made it difficult to trace the source of the infection in particular cases, especially in urban areas. The work done by Crosby and himself on the 1947-1948 epidemic in South Australia indicated that there were approximately two cases of clinically recognizable non-paralytic poliomyelitis to each paralytic case. Family transmission was frequent and important.

With regard to tonsillectomy, Dr. Southcott said that there was no doubt that patients who had recently undergone tonsillectomy were predisposed to contract bulbar poliomyelitis in the presence of an epidemic. There was experimental confirmation of that predisposition in monkeys. A recent re-survey of some features of the 1947-1948 South Australian epidemic had shown that there was a significantly higher proportion of those who had previously undergone tonsillectomy among those with paralytic poliomyelitis than in the general population. Separation of the paralytic cases into bulbar and non-bulbar showed that a very high proportion of patients with bulbar involvement had undergone a tonsillectomy at some time in their lives; thus out of 40 patients with bulbar involvement, 34 had had a previous tonsillectomy, five had not, and in one case it was not known whether the patient had undergone tonsillectomy. The interval between tonsillectomy and the contraction of poliomyelitis was often of the order of five or ten years. No evidence of an association between a previous tonsillectomy and the non-bulbar paralytic cases had been found. A comparison of the data on the intervals between tonsillectomy and bulbar poliomyelitis in scholars with a control series of scholars surveyed in 1952 had indicated that the association was of the order of five years, perhaps longer. A paper on that would be published shortly.

Dr. Southcott discussed the relation between poliomyelitis and injections, and pointed out that, if possible, prophylactic injections should be given before the age of six months when necessary during a poliomyelitis epidemic.

The Diagnosis of Poliomyelitis.

M. L. POWELL (Victoria) discussed the diagnosis of poliomyelitis. He thought that the most helpful method was to subdivide the signs and symptoms into the following three groups. Group I contained symptoms and signs of minimal diagnostic importance—headache, fever, anorexia and vomiting, drowsiness and lassitude, photophobia and constipation. Those were simply symptoms of an infective illness and were of little help in the precise diagnosis of poliomyelitis. Group II comprised the symptoms of maximal diagnostic importance—migraine, posterior neck and back pain, aggravated by flexion; asymmetrical aching in one or more limbs; "paralytic" symptoms, for example, a weak limb or vocal changes indicating bulbar involvement. Group III comprised negative indications—in other words, symptoms and signs which actively negated a diagnosis of poliomyelitis. They comprised: (a) high fever—for example, 104° to 105° F.; (b) the absence of fever; (c) cough, except as a coincidence; (d) diarrhoea; (e) excessive vomiting; (f) a violently sore throat; (g) mental clouding and convulsions; (h) the occurrence of a rash or rigor and the appearance of a palpable spleen; (i) the occurrence of what might be described as "stiffness" of the limb; (j) the combination of an apparently grossly weak limb with active reflexes. Dr. Powell thought that by combining and assessing those groups of symptoms and signs a decision would be made. He described the several practical points in the elucidation of neck stiffness; he also described the value of the change which occurred in the cerebro-spinal fluid. He discussed certain aspects of treatment under four headings. Under the first heading Dr. Powell drew attention to the fact that so far no specific prophylactic or curative treatment had been forthcoming. Under the second heading he referred to the need for all patients about whom a definite diagnosis of poliomyelitis had been made or in regard to whom the diagnosis was doubtful, to have bed rest for a minimal period of fourteen

days. He also referred to the need for the assessment of all cases during that period and of those in which apparent weakness was not present. Further assessment was necessary after the patient had become ambulatory. Under the third heading he mentioned the indications in the management of patients with definite limb and trunk weakness. Lastly, Dr. Powell referred to the specialized management of patients in the bulbar group, particularly in regard to the management of deglutition, drainage of the respiratory tract, secretions, the use of tracheotomy, the respirator, and antibiotic control.

The Orthopaedic Management of Poliomyelitis.

E. E. PRICE (Victoria) said that there had been no outstanding advances in the treatment of poliomyelitis, but there had been a tendency to greater activity. This meant less splinting and more movement with an earlier resumption of normal activity. The condition described as "muscle spasm" received more attention. The period of rapid recovery occupied six months, and that of economic recovery twelve months, though there were exceptions to this. Treatment involved many services, and these required to be integrated on a State-wide basis. The course of the disease was divisible into acute, convalescent and chronic stages, and an orthopaedic aspect existed in each. In the acute stage the muscles were rested, but the joints must be kept mobile. The problems of the convalescent stage were muscle recovery, deformity and circulatory deficiency. Splinting was required to secure rest and prevent deformity, but splints must be removed for treatment, for bathing and for a "free period" daily. The "free period" was gradually extended. When all useful muscle recovery had ceased, the chronic stage was reached. At that time one considered splints or surgical measures to stabilize deficient joints and to control deformity.

Rehabilitation in Poliomyelitis.

DOUGLAS GALBRAITH (Victoria) discussed rehabilitation in poliomyelitis. He said that good rehabilitation procedure—by which he meant those measures which would restore the patient as a complete personality to the fullest physical, mental and economic life possible—was part of good general treatment. Most of his remarks would refer to children. Dr. Galbraith said that if the child had to be treated in hospital, the keynote of the hospital's planning would be to let the child think, plan, work and play so as to feel a sense of accomplishment and to have a healthy anticipation of the next day's activities. He deplored the previous custom of confining a child in a frame for long periods; that regime in his opinion produced not only splintogenic deformities of the body, but also splintogenic deformities of the mind. He stressed the need for the physiotherapist to have sympathy for the child and to be able to reassure him and give him confidence; she must see the child as an individual and not as a "case". Occupational therapy at the right time could become remedial; the physiotherapist and occupational therapist should work together. Dr. Galbraith referred to the great importance of the fear undoubtedly felt by every paralysed person, children no less than adults. Rehabilitation should be based on teamwork which from the earliest day of illness would be planned to reassure the patient, and to plan activities for his mind and the unaffected parts of his body. Dr. Galbraith referred to the important part played by the ward sister and the teacher. Both should be part of the rehabilitation team. The child's normal appetite for acquiring knowledge should be satisfied; regular attendance at school gave the child in hospital a sense of security and a feeling of growth. Stressing the problems of pre-school children, Dr. Galbraith said that their emotional needs were often greatest; the nurse and teacher must play the part of parents and give understanding, a sense of security and affection. An intelligent nurse with training in child management and play therapy could be invaluable in a rehabilitation team. A patient who left hospital after successful rehabilitation went out with his mind adjusted to his physical limitations. The medical social worker would also have played her part in preparing his parents and relatives and showing them how to help him. The

objectives of daily living, which the patient had to meet, were (i) ability to get about, (ii) ability to use the hands with maximum efficiency, (iii) ability to take care of himself and be independent. These aims were not easy to evaluate from the standard muscle chart; there was scope for the type of analysis chart of daily living, which had been devised at the Warm Springs Clinic in the United States. Such evaluation was important, especially for the adolescent and young adult; it gave information about the economic future of the patient and about the type of work he could do. Occupational therapy at that stage might well pass over into pre-vocational training. Dr. Galbraith pointed out that no matter how fitted a person was for a particular job, he must be able to get to and from it; transport might be a problem. He considered that in physiotherapy departments there should be more rehabilitation apparatus to teach poliomyelitis patients the tricks of coping with everyday life—for example, how to get on or off tram cars or buses, how best to use their eating utensils, how to handle a wheel chair. Dr. Galbraith instanced the successful work done in rehabilitation at the orthopaedic section of the Children's Hospital at Frankston. In conclusion he pointed out that what was most needed in Australia was a greater degree of coordination in the problems of poliomyelitis, all types of workers as well as doctors being brought together to pool their knowledge and ideas.

Discussion.

ROBERT SOUTHEY (Victoria) opened the discussion by asking two questions: (i) what was the optimal age for prophylactic inoculation? (ii) what advice should be given to parents in regard to tonsillectomy in poliomyelitis epidemics? He endorsed Dr. Powell's stressing of vocal symptoms, and mentioned that there was some possibility of the occurrence of bronchopneumonia in these cases. He agreed that of the negative indications convulsions were the most important.

Sir Macfarlane Burnet, in reply, said that there was less trouble in the United States of America with regard to poliomyelitis following prophylactic immunization because of the tendency to give such injections earlier. There was no objection to immunizing children in the three to four months age group. A child in arms was unlikely to develop poliomyelitis. He further stressed the importance of Dr. Southcott's figures regarding the incidence of bulbar palsy following recent tonsillectomy.

A. FRYBERG (Queensland) asked whether the stiff limb mentioned by Dr. Powell as being unlikely to be indicative of poliomyelitis included the limb in spasm. If it did, he felt that some cases might be missed. In 1946 they had found that treatment in plaster or in frames for as long as six weeks tended to produce stiff limbs, hunched shoulders and *genu valgum*. That had been noticed throughout Australia, but on a visit to the United States about that time they found a majority of children being treated on mattresses, the limbs being controlled with footboards and sandbags only. Dr. Fryberg sought information as to what was the best position for maintaining the arm.

Dr. Powell, in reply, made it clear that his remarks with regard to stiff limbs referred to early diagnosis only. Poliomyelitis patients were not stiff in this stage of lower motor neuron palsy.

Dr. Price, in reply, said that his experience was similar. Patients came to him relatively late from fever hospitals, and in the earlier days were often stiff. That might have been due to special epidemics in which spasm was a prominent feature; the limbs appeared, as it were, congealed. When they were of that type, he used to put the child through a de-stiffening process, removing the splints, applying moist heat and using frequent movements, particularly abduction. The best position for the arms was not fully abducted, but at about 45°.

B. P. McCLOSKEY (Victoria) referred to muscle spasm. He said that there was no such physiological condition in poliomyelitis. What was meant by people who spoke of "spasm" was a painful resistance to stretch on the part of a muscle. Dr. McCloskey referred to the work of Bennett, who had

said that poliomyelitis was a disease also of the collagenous system as well as of muscle. The newer conceptions of recovery showed reeducation to be not merely a matter of muscle hypertrophy, but of training neurons to take over new functions. All muscles were not designed primarily to act against resistance, and this must be considered during the reeducation process. It was not certain that children under twelve months of age had a lower morbidity. It might simply be that they were less likely to be exposed. It was dangerous to think that one could give live poliomyelitis virus to babies. With deference to Dr. Powell he considered that diarrhoea could occur in some epidemics of poliomyelitis.

Dr. Price, in reply, agreed that he meant "spasm" in the sense of "painful resistance to stretch on the part of the muscle".

Dr. Powell mentioned a New Zealand epidemic in which 10% of the children had diarrhoea, and a South Australian epidemic with 6%. This was in his opinion a very low figure, so that it might be considered not a symptom but a coincidence.

F. V. SCHOLES (Victoria) said that he remembered some epidemics in which diarrhoea and tonsillitis were a feature, but these symptoms were missing in many cases. He then referred to the widely held notion that poliomyelitis was noticeably a disease of summer and autumn. This was certainly wrong in Victoria, where their three largest epidemics had been winter ones and he had expected a falling off in the summer, which had proved correct. During the Brisbane epidemic in 1951 the heaviest incidence of cases had been in July and August. Dr. Scholes said that ever since 1912, when faeces had been found to contain poliomyelitis virus, attempts had been made to coordinate the spread of poliomyelitis with that of other bowel disorders. He considered that epidemiologists were trying to make a good case for the transmission by food and drink, for which Dr. Scholes himself thought that there was no good evidence.

L. HUGHES (New South Wales) mentioned that in a recent epidemic he had seen a number of cases of Bornholm's syndrome in which pain in the chest was present, waning with the decline in cases of poliomyelitis. After this happened there was a corresponding increase in the number of patients showing symptoms of encephalitis.

Dr. Powell said that he had had no experience of this in Melbourne; he had seen only one case of Coxsackie virus infection.

Dr. McWhae, from the chair, after summarizing the papers given by the various speakers, spoke of the present position with regard to isolation. He said that during an epidemic infection was widespread and invisible; many were susceptible and the carrier rate was high. This particularly applied to those in contact with new cases. He held that children and adults from such households should be quarantined for periods of up to twenty-one days if this was at all possible.

RECENT ADVANCES IN INFECTIOUS DISEASES.

A PLENARY SESSION was held on the subject of "Recent Advances in Infectious Diseases". The chairman was H. McLORINAN (Victoria).

Epidemiology.

A. FRYBERG (Queensland), discussing epidemiology, said that Morgan, using active Lansing poliomyelitis virus, had immunized monkeys to a degree at which they became resistant to intracerebral challenge. The antibody level fell after eight months and then remained at a moderate level for the next four months when a booster dose was given, after which the protection level was restored, but again gradually fell. At the end of twelve months protection was afforded in only 50% of cases. Hammon had shown that the percentage of children in an age group possessing poliomyelitis antibodies depended on the

hygiene of their surroundings. Should the percentage in the seven to nine years age group be less than 70, the percentage in older age groups, instead of increasing, was lower, showing that the antibodies were temporary in nature and required repeated and frequent reinfection, as occurred in primitive people, to keep up the level. The conclusions of those two workers made it appear that the protection afforded by a vaccine might last one or two years unless a "booster" dose was given. If that was the position, the value of a vaccine from a public health viewpoint was doubtful. Bodian, using γ globulin, had produced passive immunity in monkeys lasting six to eight weeks. Its value as a public health measure in Australia would be doubtful unless it could be used with a safe immunizing agent.

Dr. Fryberg then expressed doubt as to whether the bowel played an important part in the spread of poliomyelitis. He said that the "fanning out" pattern of spread of an outbreak of Sonne dysentery in Brisbane was different from the spread of poliomyelitis, which was more like that of a respiratory condition. Research into the unknown fevers of North Queensland had shown the presence of *Leptospira canicola*, a strain of organism which resembled *Leptospira medanensis*, and another which appeared to be a new strain of leptospira. Their presence had not been reported previously in Australia. Singer, investigating institutional gastro-enteritis, had formed the opinion that spread of infection was not from the baby via the nurse to another baby, but by direct contact from a member of the staff who was a "carrier".

Some Aspects of the Bacteriology of Infectious Disease.

A. A. FERRIS (Victoria), discussing the bacteriology of infectious disease, said that modern antibiotic treatment had introduced certain difficulties into the laboratory diagnosis, in some instances necessitating a different line of approach. Ideal confirmation of a clinical diagnosis was provided by speedy demonstration of the causal organism—for example, the growth of *Salmonella typhi* from a blood culture or of virulent *Corynebacterium diphtheriae* from a throat swab. In modern hospital practice an increasing number of patients had prior antibiotic treatment, and direct bacteriological methods commonly failed to reveal the causal organism. Dr. Ferris said that in his own experience meningitis and diphtheria provided many such diagnostic problems. It was suggested that whenever possible a relevant specimen, such as a throat swab, should be collected before the exhibition of antibiotics. Since direct bacteriological methods so frequently failed to yield useful information, the tendency was to rely for laboratory diagnosis more and more on serological methods, the tools of the epidemiologist. Such tests, in the main, provided a diagnosis only in retrospect and were a poor substitute for direct methods.

Dr. Ferris, in conclusion, emphasized that most serological tests were useful for clinical diagnosis only when they demonstrated newly developed antibody, which meant that at least two serum samples had to be obtained from the patient.

Isolation and School Problems.

LEIGH COOK (Western Australia), in opening his paper on isolation and school problems in infectious diseases, said that modern opinion as to whether an attempt should be made to prevent the spread of the common virus infections of childhood had been plainly stated by Sir Macfarlane Burnet, who maintained that where measles, German measles, chickenpox and mumps were concerned, it was to the advantage of the child that he or she should become infected between the ages of five and twelve years. The patient should be excluded from school only so long as symptoms or signs were present. Contacts should not be excluded at all. The quarantine period and isolation of such patients in the past had given the public an altogether false idea of the importance of those diseases. It would be of great advantage to the community if a public conscience concerning the early isolation and treatment of the com-

mon, cold and of the sore throat was as keenly developed as the conscience concerning "spots" had been in the past. It was still not generally realized that the sore throat was sometimes the precursor of serious and disabling disease. It would facilitate the education of the public if regulations throughout Australia were reduced to plain, simple and consistent terms. Recent recommendations by the National Health and Medical Research Council, formed with a view to rationalizing the procedure to be adopted and obviating any unnecessary wastage of school time, represented a big step forward. However, those recommendations might still produce some confusion in the public mind, in that they made some special provision for kindergartens and boarding schools not altogether consistent with the general recommendations. It was recognized that epidemics of peculiar virulence and severity might arise as they had in the past. Such epidemics might require special measures.

Recent Therapeutic Advances in Infectious Diseases.

H. McLORINAN (Victoria) said that the discovery of the sulphonamides had initiated a new era in the treatment of bacterial infections. After the introduction of penicillin new antibiotics had been developed with breath-taking rapidity. A stage had now been reached at which it was difficult to convince the younger generation that it was not always necessary to treat every acute infection with a barrage of antibiotics. In that connexion one applauded with reservations the note of warning in recent articles deploring the wholesale use of antibiotics. Dr. McLorinan went on to say that in his present paper an endeavour would be made to assess briefly the effect of modern drugs on some of the common infectious diseases.

With scarlet fever penicillin given over a period of five days during the acute stage shortened the duration of the illness and lessened the incidence of all complications. The infectious period was rarely more than ten days and in most cases was a great deal less.

Dr. McLorinan said that it was humbling to have to admit that there had been little advance in the treatment of severe toxic diphtheria. Penicillin had little or no effect on the malignant toxic form of the disease. It did, however, tend to prevent the development of the convalescent carrier. Once the carrier state was well established penicillin was often again disappointing. In cases of laryngeal diphtheria and other forms of acute obstructive laryngitis, especially when tracheotomy was required, a different story would be told.

Referring to meningococcal infections, Dr. McLorinan said that the fulminating form of septicaemia still claimed its victims. Intensive and massive intramuscular penicillin therapy was advocated. Supportive measures should play a secondary role. Cortisone had been disappointing.

With whooping-cough the use of the newer antibiotics had lessened the severity of the pulmonary complications and had thus lowered the mortality rate. No convincing evidence had been supplied, however, proving that they had lessened to any extent the severity or frequency of the paroxysms or the duration of the disease.

In the case of virus diseases an effective therapeutic agent against the smaller viruses had yet to be discovered. By eliminating or reducing the influence of the secondary invaders, antibiotics had changed the clinical picture in a number of virus diseases such as measles and influenza. Dr. McLorinan said that he had not seen any result from the use of antibiotics which were claimed to have antiviral action against diseases such as mumps, measles and herpes.

Infections of the central nervous system, particularly virus infections, appeared to be increasing. For many of the bacterial infections there were suitable specific antibiotics, but one was limited to those in which the responsible bacterial agent could be recognized. In many cases a virus infection was postulated without any real evidence that a virus was responsible; but in no known virus infection of the nervous system was any specific therapy available which would influence the course of the disease. They could not afford to be smugly satisfied with such a position.

Discussion.

E. P. CORDNER (Victoria) questioned why scarlet fever should be regarded as a separate entity from streptococcal sore throat, just because a rash was present in the former condition. Sometimes one member only of the family showed a rash while others with similar symptoms showed no rash.

STANLEY WILLIAMS (Victoria) asked whether antitoxic or antibacterial serum was any longer used in the treatment of scarlet fever; also whether adults were really significant carriers of gastro-enteritis organisms, in view of the fact that it was known that infants themselves remained carriers for some time after their illness. He asked whether Dr. Ferris would enlarge on the influence of antibiotics for the production of immunity. Should they be withheld in mild infections, so as not to spoil the immunity?

ELLEN KENT HUGHES (Armidale, New South Wales) said that in the poliomyelitis epidemic in her district in 1951 there had been about equal numbers of paralysed and non-paralysed patients. She inquired whether they should be treated as equally infectious and whether they could be nursed together. She also mentioned that practically all the cases in the city came from among the customers of one of two bakers, and that two people employed in that bakery had developed poliomyelitis. She further wanted to know whether "Chloromycetin" was of any value in pertussis.

F. W. ARDEN (Queensland) said that, in his experience, not only were an increasing number of staphylococcal strains becoming resistant to penicillin, but with those that did still react larger doses than formerly appeared to be necessary. In the first 16 cases of osteomyelitis treated at the Brisbane General Hospital with penicillin alone, doses of only 15,000 units every three hours were given, with successful results. Dr. Arden inquired of Dr. McLorinan whether the withdrawal of all penicillin, say for a decade, would result in organisms regaining their former susceptibility to penicillin.

P. L. COLVILLE (Victoria) inquired why contacts of poliomyelitis had to be excluded in epidemic times, whereas they were allowed to go free in non-epidemic times.

A. MCQ. THOMPSON (Victoria) asked what was the best time to immunize a child against diphtheria and pertussis when poliomyelitis was about.

C. E. COOK (Canberra) mentioned that the document distributed by Dr. Leigh Cook did not embody the final recommendations of the National Health and Medical Research Council with regard to the isolation of school children. It had formed the basis of a discussion, and some slight modification had been prepared by each of the States.

R. H. MCCARTHY (New South Wales) inquired what average doses of the newer antibiotics were being given to children with pertussis, because the size of the dose might influence opinions about its effect.

A. R. SOUTHWOOD (South Australia) said that he sympathized with Dr. Ferris in his quandary between investigation and treatment. It was often hard to decide whether one should wait for a diagnosis or embark at once on treatment.

Dr. Fryberg, in reply, said that in recent dysentery epidemics in Brisbane carriers had not persisted for long. The most recent outbreak had been traced to a single adult carrier. He saw no reason to separate paralysed and non-paralysed poliomyelitis patients. There was no law compelling hospital employees to go off duty when they had colds.

Dr. Ferris, in reply, said that there was a poor production of antibodies if organisms were quickly eliminated after antibiotic therapy; for example, antistreptomycin titres tended to be lower after recovery in cases of penicillin-treated streptococcal throat. To another questioner he said that one could not expect benefit to arise from pertussis vaccine administered during the course of the disease.

Dr. McLorinan, replying to Dr. Cordner, said that he felt many cases diagnosed as of streptococcal tonsillitis were in fact cases of glandular fever. They had only administered scarlet fever antitoxin to five of the last 200 patients and did not consider it necessary. "Chloromycetin" and other antibiotics had lessened the pulmonary complications of pertussis in controlled series, but had proved disappointing otherwise, having no effect on the number of spasms or the duration of the disease. He agreed that vaccines were useless in the treatment of pertussis. He could not say whether a sufficient number of organisms would regain their sensitivity if all penicillin therapy was interrupted for a decade. In view of published work on the subject, he would desist from pertussis immunization during epidemics of poliomyelitis. If compelled to do so, he would immunize a baby at two to three months of age, which was a reasonably safe period. In their controlled series at Fairfield they had used an average dose of 250 milligrammes per day for children aged under eighteen months. Larger doses of "Chloromycetin" tended to produce gastro-intestinal symptoms. Terramycin seemed to be just as good, and less likely to cause intestinal upset.

Dr. Leigh Cook, in reply, said that he could not tell why the writers of the schedule had advocated isolation of poliomyelitis contacts only in epidemic times. Perhaps it was to satisfy the public demand that something be done.

THE USES OF CORTISONE AND ACTH.

A PLENARY SESSION was held on the subject of "The Uses of Cortisone and ACTH". The chairman was H. MAYNARD RENNIE (New South Wales).

Clinical Applications of Cortisone and ACTH.

KEITH HARRISON (New South Wales) said that widespread physiological effects were produced by flooding the body with an excess of adrenal cortical hormones. Under their influence the renal tubule usually retained sodium, chloride and water, and excreted undue amounts of potassium and calcium. Cortisone might produce diabetes in some predisposed subjects and greatly aggravate a pre-existing diabetic state. There was an excessive breakdown of protein in the tissues with excretion of more nitrogen in the urine. Uric acid output was increased. Cortisone produced atrophy of lymphoid tissues and tended to reduce the number of circulating lymphocytes and eosinophile cells. The neutrophile cells were often increased in number. The red cell count might be elevated in Cushing's syndrome. Psychic abnormalities from euphoria to mania had been noted, and convulsions might occur. The blood pressure was variably affected; sometimes there was extreme elevation, though the mechanism was not known. The adrenal itself became hypoactive when cortisone was given, but was hypertrophied and hyperactive during treatment with ACTH. In both cases the anterior lobe of the pituitary gland would be depressed. Dr. Harrison showed charts in which were grouped those clinical disorders which gave a very good, a good or a variable response to cortisone treatment. Also listed were those which either did not respond at all or which might even be made worse by such therapy. A review of 88 patients treated with cortisone or ACTH at the Royal Prince Alfred Hospital, Sydney, showed that the responses were similar to those recorded in the literature, though a little less rapid and complete. He gave a description of the results of treatment in certain general medical disorders with some illustrative case reports.

Cortisone and ACTH in Rheumatoid Arthritis.

R. F. A. STRANG (Victoria) said that the place of cortisone and ACTH in the treatment of rheumatic diseases was still not settled. It was apparent that the compounds suppressed part of the disease symptoms, but left untouched the basic process of rheumatoid arthritis. That process was a fibrinoid destruction of connective tissue

which did not repair. Cortisone reduced the cellular reaction to that process, but did not affect it otherwise. Cortisone also prevented the formation of collagen fibrils in tissue cultures of fibroblasts. The dosage of cortisone required for suppression of a patient's symptoms varied from case to case and from day to day. In a series of 39 cases the dosage varied from 37.5 milligrammes to 75 milligrammes per day, the most common level being 62.5 milligrammes. All those patients who ceased taking it, except two, relapsed severely. Most were treated as out-patients, and in general the aim was to raise the status of the patient by all other means, including the exhibition of gold, transfusions, splinting and rest, before commencing cortisone therapy in order to reduce the dosage required or avoid its use altogether. Of 39 subjects with rheumatoid arthritis who commenced cortisone therapy, six were given only three grammes by intent and 14 ceased treatment because of complications such as thromboses, death from infection, spread of pulmonary tuberculosis, personality changes or failure to respond. One patient was still receiving cortisone after twenty-four months, another after twenty months, with continued relief. Eight of the 19 still receiving it were regarded as showing "good" results, eight as "moderately" good results and three as "improved". One patient had silicosis as a complication, which had shown no signs of resolution after three months' continuous cortisone or ACTH therapy. In two cases osteoarthritis treated with cortisone was temporarily relieved, but then relapsed, and other joints deteriorated. It was inadvisable to use cortisone without taking into account postural abnormalities or any orthopaedic problem which could be corrected. Painful shoulders had given varying results to treatment. In some cases subacromial bursitis responded in a matter of days to ACTH or cortisone; in others the patients required manipulation to regain complete movement after weeks of therapy. Post-myocardial infarction or post-traumatic shoulder-hand syndrome responded adequately but slowly. Ankylosing spondylitis had given a good temporary response in one case, but disappointing results in another three. Scleroderma in early cases responded to the extent of loss of pain and loosening of tissues; but the process was still present and cyanosis occurred in cold weather. Three patients with the condition in an advanced form died during or at the conclusion of a course of cortisone therapy. In surgery more rapid return of movement in joints operated on seemed to occur; but in one case in which a second operation was required during treatment, the wound broke down.

ACTH and Cortisone in Surgery.

E. VERNON BARLING (New South Wales) discussed the use of ACTH and cortisone in surgery. He said that in only a few instances did these substances produce dramatic results. Such dramatic results occurred probably in the presence of acute adrenocortical failure, or with a medical condition which exhibited such a response. Encouraging results had been reported in some allergic conditions. Dr. Barling mentioned one case of laryngeal oedema following thyroidectomy in which relief was dramatic. Varying results were reported in inflammatory conditions in joints and tendons, the most favourable outcome being forthcoming in the early stages. There had been no dramatic effect in ulcerative colitis, but Dr. Barling mentioned two cases in which improvement had been sufficient to allow surgical operation to be carried out. The use of ACTH and cortisone in burns gave rise to no dramatic change, and in most instances one gained the impression that adequate supportive therapy along the usual lines had equally favourable results. It was possible, however, that severely burned patients might survive the infective phase with greater certainty if cortisone was exhibited; at the same time it was not possible to determine with any certainty which patient would receive benefit. In an Australian series of cases investigated, eosinophile cell counts had not been considered helpful as a criterion of adrenocortical failure or of the necessity for the use of those drugs.

Observations on the Role of Cortisone in Medical Pædiatric Practice.

BRYAN DOWD (New South Wales) read a paper entitled "Some Observations about the Role of Cortisone in Medical Pædiatric Practice". He said that his experience of the use of this substance was small. He gave examples of the transient response of acute juvenile rheumatism and acute leucæmia to cortisone therapy. Complicated laboratory control of treatment had not as a rule been used at the Royal Alexandra Hospital for Children, Sydney, but those simpler things which were more readily available to the clinician at the bedside in the hospital ward had been employed. Thus daily recording of weight, blood pressure, urinary changes and output had seemed safe means of therapeutic control, but the danger of unsought effects was ever present. Dr. Dowd said that the advent of cortisone and like substances had made obvious the present lack of knowledge of the natural history of disease. This knowledge was a necessity if the evaluation of new treatment was to be accurate. Those popular words and phrases such as "collagenoses", "mesenchymal ill-health", "cortisone group of diseases", the classification of disease from the therapeutic aspect, the tendency, in fact, to think therapeutically so that cortisone became the treatment whether the diagnosis was rheumatic or rheumatoid, whether it was hæmolytic or hypoplastic anæmia or for that matter leucæmia—all of those things were nothing much if they lost sight of that thorough knowledge of the whole patient which they meant when they said "diagnosis". He believed that the whole problem needed present thought and care, and that it needed knowledge which was based upon the wisdom of the past. The future necessity was hard study of natural as well as of induced phenomena.

Discussion.

C. H. BEST (Toronto, Canada) said that in Canada a similar symposium at which J. C. Brown and H. Selye were the speakers showed that the clinical position in Canada was very much the same as it was in Australia. The National Research Council in Canada had distributed ACTH and cortisone to various clinics for clinical trial and had also subsidized the manufacture of ACTH and the growth hormone at the Connop Laboratory, a department of the University of Toronto. Evidence that the growth hormone liberated desoxycorticosterone was by no means established, and he felt that Selye was less convinced about this than he had been. Professor Best considered that the greatest contribution that ACTH and cortisone had made was that they had forced clinicians to review their knowledge of endocrinology. He knew Kendall, Hensch and Thorne very well. He briefly reviewed the career of Thorne, who, he said, had one of the most active departments of medicine in the world. Randall Sprague, at the Mayo Clinic, and Fulsham were both child diabetics who had been receiving insulin for the past twenty years. In a review of advances in carbohydrate metabolism, Professor Best said that Britton and Silvert at Montreal were the first to show the effect of adrenalectomy on carbohydrate metabolism. Long and Lukins had shown that it was possible to alleviate pancreatic diabetes by extirpation of the adrenals.

Professor Best went on to discuss the role of various endocrine glands in the production of hypoglycæmia, but pointed out that in some psychotic cases the self-administration of insulin was a cause which was not always recognized. The diabetogenic effect of cortisone and ACTH differed in different species. In the dog one-half of the pancreas must be extirpated before that effect was made manifest. Cohn, in an experiment in which medical students acted as the subjects, by the use of ACTH produced heavy glycosuria, 30 to 40 grammes of sugar being excreted per day. It was thought that this was due to the lower glucothione content of the blood and could be prevented by the intravenous injection of glucothione at the same time as the ACTH. The role of hexokinase was not established in this method. In part there was decreased reabsorption of glucose by the renal tubules. The diabetes produced by ACTH was most resistant to insulin, and it

was thought that possibly the insulin-resistant diabetes found in clinical cases had a similar cause. Steroid diabetes might be cured in some cases by the removal of an adrenal gland containing a tumour; seven of those patients had remained completely free of diabetes since such an operation. In experimental animals other disturbing effects had been found, such as convulsions and diabetes insipidus in dogs.

Professor Best briefly mentioned the role of heparin in the thrombosis produced by cortisone, but said that no experimental work had been done on this. In conclusion, Professor Best said that the knowledge of ACTH and cortisone was in a state of flux; although some things were firmly established, much remained yet for investigation. The advance in medicine would be greatly benefited by the stimulation of the physiological approach and the encouragement of clinicians to review the field of endocrinology.

CHRONIC COUGH.

A PLENARY SESSION was held on the subject of "Diagnosis and Treatment of the Chronic Cough". The chairman was W. GOTTER HARVEY (New South Wales).

The Radiological Investigation.

R. M. DE LAMBERT (Sydney) discussed the radiological investigation of chronic cough. He said that the underlying causes of chronic cough ranged from the psychogenic on the one hand to aortic aneurysm and carcinoma of the lung on the other. He dealt in his discussion with the general assistance which radiological methods might give, and said that he would make no attempt to cover in detail all the methods and techniques available. In regard to the upper respiratory tract, he referred to the nasal sinuses, to the mastoid antrum, to the naso-pharynx, and to the pharynx and larynx. Some of those areas could be readily inspected, but in regard to others radiological examination might be helpful. He said that it was not generally realized that the larynx, including the vocal cords and the region just below them, could be displayed clearly by tomography. Dr. de Lambert then referred to the lung, mediastinal structures and thorax. Generally speaking, he said, it was disease of the conducting mechanism as opposed to the parenchyma of the lung which gave rise most frequently to a chronic cough. The trachea and larger bronchi were sometimes identifiable in a plain radiograph, and could be clearly displayed by tomography. If the smaller bronchi were evident in the plain radiograph, it was usually an indication of disease of the parenchyma. Appearances in a plain film might suggest the diagnosis of bronchiectasis, but bronchography was always necessary to confirm the diagnosis and to delineate the extent and character of the disease. Extensive bronchiectasis might exist in spite of normally appearing plain radiographs. In bronchography it was essential that all the segments on both sides should be filled. The bronchi had to be emptied of secretion before bronchography; otherwise incomplete filling would result. Emptying was best achieved by postural drainage. After reference to bronchography in infants and young children, Dr. de Lambert said that much information could be obtained without the use of any contrast medium other than air normally present in the lungs. Fluoroscopy of the thorax should never be omitted, and should be the initial method of examination. He then described the different views of the thorax which should be taken, but added that all the methods of radiological investigation seldom enabled the radiologist to make a precise and final diagnosis. He thought that the use of the term "diagnostic radiology" was most unfortunate for this reason. There was a growing tendency among people to "get a chest X ray". This might be justifiable on public health grounds, but it was unfortunate if patients with chronic cough and their medical attendants were reassured by a failure to find any abnormality on a film of small size. The normally appearing X-ray chest film should never be accepted as

excluding pulmonary disease. Extensive tuberculous disease of the bronchi might not show on the plain radiograph, and this was true also of some carcinomata of the lung. In Dr. de Lambert's opinion the respiratory system was one of the most rewarding fields for radiological investigation, but at the present time the "chest X ray" was subjected to more abuse than any other form of medical examination. The remedy lay in a proper appreciation by the profession of the indications for and limitations of this method of examination, and a more enlightened type of propaganda as far as the general public was concerned.

Cough in Oto-Rhino-Laryngological Practice.

A. B. K. WATKINS (Newcastle) discussed cough in oto-rhino-laryngological practice. He pointed out that cough was a common symptom in ear, nose and throat practices, but said that relatively few patients in such practices complained primarily of cough as their main symptom. The "cough caused by cough" occurred when the original cause of a cough had gone, leaving a traumatic laryngitis which continued the coughing until a sedative was given, allowing the laryngitis to recover. Dr. Watkins emphasized the relative unimportance of tonsillar and naso-pharyngeal infections, as well as the great importance of nasal obstruction and sinusitis in producing cough. In connexion with cases of sinusitis associated with chronic pulmonary infection, he sounded a note of warning against falling into the error of riding minor pet forms of treatment to death to the exclusion of equally important accessory methods. He also derided the fashion of looking upon the presence or absence of bronchiectasis as the criterion or otherwise for lung surgery. He maintained that the important thing to find out was whether the lesions were capable or not of resolution without operation, and he took the unusual stand for an ear, nose and throat surgeon that, when infection surged backwards and forwards between the sinuses and the lungs, and when it appeared probable that neither was capable of resolution without very radical surgery, efforts along operative lines were best directed at the pulmonary lesion first, because such lesions when well developed were generally less capable of resolution than apparently similar severe sinus infections. He did, however, make a plea for the use of radical pan-sinus operations, such as Patterson's ethmoidectomy, in certain selected cases.

Aspects of Diagnosis and Treatment.

CLIVE FITTS (Melbourne) discussed some aspects of the diagnosis and treatment of the chronic cough. He said that cough was composed of three distinct phases—inspiratory, compressive and expulsive. Cough was a physical effort, and it was clear that inspiration and compression were common components of many different types of effort. Some of these were singing, laughing and crying. In the third or expulsive phase, the glottis was opened and successive contractions of the abdominal muscles took place. Referring to the production of a cough, Dr. Fitts said that beyond a certain point in the bronchial tree cough was not a symptom unless sputum or blood, hydatid or other fluid was able to move from its source to an area where the reflex could be initiated. Tuberculosis, carcinoma of the lung parenchyma, lung abscess and silicosis were examples of diseases of the lung substance in which there was no cough until there was material to be evacuated. Dr. Fitts also pointed out that inflammation or irritation in the larynx, trachea or larger bronchi, and indeed stimulation of the efferents in the pharynx and stomach, would produce a cough with little or no sputum. These were the territories of the dry cough. There were certain features about cough which should be sought in the taking of a history. The first of these was the time of its occurrence. Dr. Fitts referred to early morning cough, cough during working hours, periodical cough and cough in the recumbent position. The second point of inquiry should be for the presence of sputum and its character, as well as its amount. The third inquiry should be whether blood had been coughed

up and in what quantity, and fourthly it was wise to discover whether wheezing existed as well as cough. It should also be remembered that the problem might be confused by a number of possible causes for cough existing in one person. Discussing the treatment of cough, Dr. Fitts said that remedies for it were no less popular than purgatives for constipation. There were numerous expectorants, all of which were of doubtful value. Dr. Fitts commended the use of morphine for a patient suffering from a serious hæmoptysis, and he said that a linctus might be the only solace for a racking cough. He made a plea for the use of a neglected drug, valerian; in combination with bromide it was a valuable preparation when the patient was nauseated by food and inclined to retch with coughing. Dr. Fitts added that as cough was under the control of the will, it might be the expression of an emotional disturbance. He referred to control of cough by the will, to laryngeal vertigo, which had been described by Charcot in 1876, and to cough associated with neurosis. He concluded by discussing the desirability of teaching the person how to use his breathing apparatus correctly, and how to control his cough. He said that it was demoralizing for patient and doctor to continue an association in which the only tie was a bottle of medicine, and beneath which lay a sense of failure.

Surgical Aspects.

H. D'ARCY SUTHERLAND (Adelaide) discussed surgical aspects of the diagnosis and treatment of chronic cough. He said that when a patient came complaining of cough, an attempt should be made to analyse the cough, and even to picture the responsible pathological change in the respiratory system. He set out the coughs which might be treated surgically under five headings, as follows: (i) Lesions in the lumen of the bronchial tree. These included foreign bodies, cavities connected with the bronchial tree, and bronchiectasis in all its degrees. (ii) Lesions in the wall of the bronchi, such as tuberculous endobronchitis and bronchogenic newgrowths. (iii) Pressure on the bronchial tree from outside by enlarged mediastinal glands or an aortic aneurysm. (iv) Cough resulting from the aspiration of excess pharyngeal secretion. (v) Cough resulting from the expectoration of pus draining into the bronchial tree through a broncho-pulmonary fistula or a fistulous connexion, with chronic suppuration in the liver. Most of these lesions had characteristic X-ray appearances. The main surgical problem to be considered was carcinoma. The cough in this condition should be looked on as acute rather than chronic, because if the newgrowth was not recognized early, all chance of cure was lost. The so-called classical signs and symptoms of carcinoma of the lungs should be recognized as the signs of impending death; they were useless points in the recognition of the disease in a treatable form. All hope of cure rested with early diagnosis, and cough was the earliest and most consistent symptom. Any patient who had chest symptoms or signs persisting for longer than three weeks should have an X-ray examination of his chest undertaken. There was no economic reason why this should not be done. The only treatment which offered possible cure of carcinoma was resection of the lung. In the treatment procrastination had no place. In regard to bronchiectasis, Dr. Sutherland insisted that the bronchographic evidence was so important that it should be 100% perfect. The lipiodol should outline the whole of the bronchial tree, and if any part was missed the examination would have to be repeated until satisfactory filling had been achieved. When the diagnosis was certain and the affected lung segments were known, surgical resection could be carried out. Dr. Sutherland referred to infection of the maxillary antrum, which might require surgical treatment, and he said that this might be done in collaboration with ear, nose and throat surgeons.

The Use of Physiotherapy.

KENNETH N. MORRIS (Melbourne) read a paper on the use of physiotherapy in chronic diseases of the chest. He began by saying that in most chronic chest diseases the patient suffered from some disability such as faulty respiratory movement, chest deformity or faulty bronchial

drainage. The correct use of physiotherapy could do much to remedy those faults. Dr. Morris then referred to the movement of respiration, and said that as breathing was a habit, the acquisition of bad habits was easy, and their eradication difficult. However, with the help of a skilled physiotherapist this could be done. There were two distinct forms of thoracic function produced by chronic diseases of the chest, and each type required its own type of remedial exercises. In a condition such as asthma and emphysema, the essential fault was that the thorax was held in a position of maximum inspiration. In most other chronic conditions the chest was held in a contracted state, in a position of expiration. Dr. Morris then described the use of physiotherapy in asthma and emphysema, and showed how the essential fault might be overcome. He then discussed physiotherapy as an aid to the treatment of suppurative conditions of the chest. This showed how the physiotherapist might produce good movement in areas where this was defective. He described the use of physiotherapy in bronchiectasis, and pointed out that if the postural drainage was to be effective, a good bronchogram, in which all affected areas were displayed, was needed. Postural drainage was of great value in the preparation of bronchiectatic subjects for operation. It was of more value than bronchoscopic aspiration, because no bronchoscopic sucker could ever reach all the minor bronchi affected by widespread bronchiectasis. Dr. Morris concluded by emphasizing the fact that these procedures would not be really effective unless the patient was intelligent and cooperated fully with the physiotherapist.

Discussion.

B. L. DEANS (Victoria) stressed the value of microfilms and said that it was uneconomical to take full-size postero-anterior and lateral films of all patients who were referred for radiological examination.

H. WUNDERLY (Canberra) said that he wished to make a statement and then ask a question. He said that, like many others, he hated the term "mass survey", and he would like to dissuade enthusiasts, both medical and lay, from the view that a normal miniature X-ray film meant freedom from pulmonary disease. The X-ray film only showed the conditions of the lungs at the moment it was taken, and because a patient had had a normal X-ray finding some two or three months previously, it did not mean that he had no pulmonary disease at the time of presentation. Dr. Wunderly looked forward to the time when there would be full collaboration between physician and radiologist, and when all hospitals would have routine chest X-ray examinations made of both in-patients and out-patients. He asked how disease could be found among the apparently healthy without mass surveys, and how it could be found among the apparently ill if routine chest X-ray examinations of patients were not made.

L. R. TRUDINGER (Victoria) pointed out that the breathing exercises commonly taught by physical training instructors in schools and elsewhere were of a paradoxical nature, in that the subjects were taught to draw in their abdomens at the same time as their chests were elevated and expanded. That meant that with inspiration the diaphragm was elevated, whereas it should be depressed. Breathing of this type would definitely be harmful in an asthmatic subject and he made a plea that something be done to correct the erroneous practice.

H. M. RENNIE (New South Wales) said that any abnormality discovered in the course of mass radiography should result in the patient's being referred for investigation by a competent radiologist. Dr. de Lambert had been very emphatic in his opinion that iodized oil was the best medium for bronchography. Dr. Rennie agreed with him that "Abrodil" had numerous disadvantages, which rendered it unsatisfactory, and asked if Dr. de Lambert had had any experience with a new preparation called "Dianosil", which he had recently used and found satisfactory, in that, while it gave adequate outline of the bronchial tree, it was rapidly eliminated after the bronchogram had been taken.

R. N. REILLY (South Australia) asked if it was not advisable to take films both in full inspiration and in full expiration, in order to detect a doubtful area of collapse.

Dr. de Lambert, in reply, said that such films would be more likely to show up areas of emphysema than of collapse, and in his opinion the best method of demonstrating doubtful areas of collapse was to "screen" the patient in order to discover in which position the opacity was most obvious, and then to take an X-ray film with the patient in that posture.

Dr. Cotter Harvey, from the chair, in summing up the discussion, said that he was surprised that no one had mentioned the question of the smoker's cough. He also regretted the absence of a bacteriologist from the panel, because he felt that he would have had an important contribution to make. He stressed the importance of a careful history in evaluating the symptom of cough, and in the diagnosis of its cause. He said that close cooperation between physician and radiologist was most important, but that radiology should continue to be the servant of the clinician and not his master. He paid tribute to the advent of the thoracic surgeon and said that it should be the aim of the physician to refer suitable cases to him at an early stage of disease, and not in its terminal phase. He concurred with Dr. Morris in regard to the important role of physiotherapy in chest diseases and said that it should be given by a physiotherapist properly trained in thoracic work.

THE MEDICAL CARE OF THE AGED.

A PLENARY SESSION was held on the subject "The Medical Care of the Aged". The chairman was W. W. S. JOHNSTON (Victoria).

Geriatrics—A Social Problem.

A. B. McCUTCHEON (Melbourne) discussed geriatrics as a social problem. He described three groups of elderly people. The first group was composed of men and women who, by virtue of strong constitutions or of freedom from a non-reaction to adverse economic stress, managed to live a fairly normal life and to keep active almost to the end. These people presented no problem to the community. The second group comprised what were known in the English classification as the elderly and infirm. They were not so fortunate as the people in Group I for various reasons, included among which were the following: (a) heredity; (b) poor social and economic conditions, with a less favourable reaction to them or with little inclination to fight them; (c) inability to profit from the assistance of relatives; (d) inroad of disease of some sort, which was not sufficient to cripple them or to render them incapable of looking after themselves to a reasonable extent. These people presented a social problem of some importance, because they were dependent on the help of others. Dr. McCutcheon thought that it was somewhat unfortunate that the people in Group II appeared to be more prominently in the public eye in Victoria than were those of Group III. He described what was being done for them by church and other organizations, and said that on the whole people of Group II were adequately cared for. Those in Group III constituted the great social problem, and were really the main object of Dr. McCutcheon's paper. People in this group might be classified into three categories: the acutely sick, the long-term sick and the irremediable. The acutely sick presented the same problem as the acutely sick in any other group of persons, and should be referred to general hospitals for treatment. The long-term sick and the irremediable were unable to help themselves and required practically everything to be done for them. Dr. McCutcheon referred to "Mount Royal", a Melbourne institution of 600 beds for men and women. For twenty-four years he had served as a medical officer at that institution. Of the total beds 340 were used for infirm patients requiring active nursing and medical care, and the remainder were for

ambulatory patients who could attend to their own personal needs. He described the treatment carried out at this institution, and said that when he looked at it today in comparison with what it had been twenty-four years ago, he felt grateful for its present state of efficiency. However, in private practice he still saw the indigent, enfeebled, old folk, some bedridden, most of them dirty and frequently verminous, some receiving charity with a grudging hand, others receiving none at all. Money *per se* was of no value to such people; what they did need was someone to take a hand and to see that they were admitted to a suitable place of accommodation. Homes to accommodate these people could be of the infirmary type, and the role of the home should be strictly that of custodian. The solution of the problem lay in the provision of infirmary beds. Patients of Group III should not occupy beds in ordinary hospitals. The cost of a bed in an infirmary compared to the cost of a bed in a hospital was roughly 6.75 to one in favour of the infirmary. In conclusion Dr. McCutcheon said that he spoke only of the position as he knew it in Melbourne.

Acute Cardio-Vascular Conditions in the Elderly.

R. WHISHAW (Hobart) discussed acute cardio-vascular conditions in the elderly. He said that he was reminded of the increase in the number of the elderly who were ill by the fact that 70% of the beds for which he was responsible at the Royal Hobart Hospital had been occupied by patients whose ages ranged from sixty-five to eighty-five years. He confined his discussion to the three most important diseases of the cardio-vascular system—congestive cardiac failure, coronary occlusion and cerebro-vascular thrombosis. In regard to the first of these he said that once the diagnosis of heart failure was established, an attempt to find the cause should be made. This sounded obvious, but it was often omitted. He discussed its causation under the headings of hypertension, coronary sclerosis, calcification of the aortic valve, toxic goitre and malnutrition. He said that hypertension might be associated with aortic valvular disease and chronic nephritis, and also with toxic goitre and with coronary occlusion. He emphasized the need for differentiating severe congestive failure associated with heavy albuminuria from chronic nephritis. Hypertensive failure was sometimes precipitated by bronchial infection; with previous bronchitis or emphysema, the question of pulmonary heart disease arose. Atrial fibrillation was frequent in hypertensive failure in the aged, but it was not *per se* a sign of heart failure, nor was it an indication for treatment when found as an isolated event. Really elderly people with chronic atrial fibrillation retained quite good exercise tolerance. In regard to toxic goitre, Dr. Whishaw said the treatment was so successful that the diagnosis of toxic goitre should always be borne in mind when an elderly person presented with heart failure without obvious reason. In discussing the treatment of congestive cardiac failure, Dr. Whishaw referred to "Thiomerin", a new mercurial diuretic, which could be given subcutaneously and was effective. In regard to coronary occlusion, Dr. Whishaw referred only to the less characteristic types. He mentioned the "minor" attacks and drew attention to the importance of diagnosis. Of equal importance was atypical infarction. In regard to treatment, anticoagulant therapy could be used, provided the necessary laboratory facilities were available. Dr. Whishaw's third group, cerebral vascular accidents, was the most distressing. He referred to cerebral arterial spasm, which he did not think occurred often in those whose blood pressure was normal. He mentioned stellate ganglion block in fully developed hemiplegia, and asked for opinions about it. In conclusion he remarked that the elderly were as a rule very susceptible to encouragement and persuasion, and to the interest taken by the attending physician. Simple psychotherapy was equal in importance to drugs, and was superior to the use of sedatives.

Limitations of Surgery in the Aged.

J. W. S. LAIDLEY (Sydney) discussed the limitation of surgery in the aged. He said that when a surgeon was called upon to deal with an emergency in an aged patient,

it was necessary for the surgeon to sum up the patient's general condition—whether he was a "good surgical risk" or not. The next thing to be borne in mind was that on the whole old people stood surgery very well, granted certain conditions. They did not stand prolonged pain well, nor prolonged operations. They did not stand disturbance of their electrolyte balance, nor did they stand well post-operative complications. The next point was the operation itself. The operation itself should be planned for efficient speed. Surgery of thirty minutes' duration was well tolerated by most old patients, but if the surgical manipulation extended to the hour or beyond it, an aged patient would be shocked and definitely "flat" for a day or two. The next thing to think of was early mobilization, and finally the complications of convalescence. The complications associated with the operation itself had to be thought of, and also those not directly associated with it. Of the latter, Dr. Laidley referred specially to acute cardiovascular failure. One alarming complication was the sudden onset of mental incoordination, usually after operation, but sometimes before it. It was most distressing to the patient's relatives, but fortunately they could be reassured that in the majority of cases the patient would return to the mental state in which he had been before the trouble occurred. The other complications mentioned by Dr. Laidley were severe arthritis in any part of the body, particularly the hip joint, senile diabetes and uræmia.

Anæsthesia in the Aged.

GILBERT TROUP (Perth) discussed aspects of anæsthesia in the aged. He said that Folds had expressed the opinion that geriatric anæsthesia should be based on the following three principles: (i) Senescence was a physiological entity and not a pathological state. (ii) Disease in senescence was complicated by degeneration. (iii) In the treatment of the aged the physiological and not the chronological age should be considered. The anæsthetist was concerned mainly with the altered physiology and degenerative change as it affected the cardio-vascular and respiratory systems. The ideal to be aimed at in anæsthesia for the aged was the same as that for all anæsthesia in surgery—"delicate surgery and light anæsthesia". In the pre-operative preparation of the patient, Dr. Troup referred to instruction in breathing exercises, and the desirability of keeping the patients mobile if the pathological condition present allowed this to be done. If bed rest had to be used, skilled physiotherapy would do much to counteract the evils resulting from immobility. A real psychological factor was the need to have the full cooperation of the patient. In anæsthetic premedication, caution and small dosage should be the watchwords. Referring to the choice of the anæsthetic agent and the technique, Dr. Troup said that the ideal drug or technique had to be found. After reference to the advantages of local and regional analgesia, Dr. Troup discussed general anæsthesia in the aged, and insisted that the fundamental principles of an efficient airway and adequate respiratory exchange were of greater importance in geriatric anæsthesia than in anæsthesia of any other type. He referred in turn to ether, the intravenous use of the barbiturates, to "Trilene", and to cyclopropane, and then to nitrous oxide and curare. He thought that in general anæsthesia for the aged it was fair to assume that there was no set routine to be followed. The choice must depend on the surgery that was contemplated, on the drugs and techniques available, and on the individual experience and preference of the anæsthetist. Provided basic principles were observed, the particular drugs used were relatively unimportant. For induction, if there was no specific contraindication, it was reasonable to use a small intravenous dose of a barbiturate. For maintenance there was a fairly strong case to be made out for the use of nitrous oxide as a foundation. Provided adequate oxygen was given with it, there was a minimal interference with the already impaired functions of the body systems. Dr. Troup finally referred to the post-anæsthetic period, and laid stress on the sensitivity of the aged to even minor degrees of oxygen lack. Routine use of efficiently given oxygen in the immediate post-anæsthetic period was highly desirable. In spite of all endeavours atelectasis occurred which could not be

relieved by simpler means, bronchoscopy and aspiration should be adopted without delay.

The Medical Care of the Aged.

A. T. EDWARDS (Sydney) said that mental disorder in the aged should not be accepted as the normal result of aging *per se*. It was the result of excessive change, due to an excess of physical and psychic traumata, acting possibly in some cases on a somatic basis weakened by a poor heredity. From the psychological point of view the problem of prophylaxis was the problem of aging, of adequately preparing in the sixth decade for a satisfactory mode of life in the seventh. Dr. Edwards thought that the problems of aging people tended to fall into six major groups: (a) getting along with the spouse; (b) loss of employment and reduced income; (c) rejection by the middle-age group and the difficulty of establishing adequate social relationships with those of their own age group; (d) the problem of adjustment to physical infirmity, which was difficult without adequate preparation; (e) the problem of finding satisfactory living arrangements; (f) the problem of finding some method of assuring the individual of his continued value to the family and the community as a person. From the psychiatric point of view the care of the aged was a medical, psychological and socio-political problem. On the medical side more attention should be paid to the treatment of circulatory, metabolic and neoplastic diseases. The psychological and socio-political problems were intimately interrelated. Much maladjustment in old age could be prevented by preparation for the problems of old age, so that there was a gradual reorientation from the active pursuits of maturity to the less-demanding cultural interests of age. In this process of reorientation, emphasis should always be kept on achievement, so that the individual could not interpret it as assistance in vegetating gracefully. Dr. Edwards mentioned what he described as the greatest difficulty to be overcome, and that was the present attitude towards retirement. In this regard Dr. Edwards referred first of all to the need for a reeducation of the general public in the general effect of increased longevity, and to the need for reeducation of the aged themselves, so that after the age of sixty they could permit themselves to be shelved gracefully without any loss of personal prestige. In conclusion, Dr. Edwards remarked that despite all that could be done, mental casualties would occur. He thought that the lunacy laws should so be altered that patients over sixty might be detained, against their will if necessary, in some institution apart from a mental hospital, where the mental and physical aspects of age could be adequately investigated, and where, if necessary, the aged could live out their lives as happily as possible.

Discussion.

Opening the discussion, J. S. ELLIOTT (Victoria) urged his audience to consider what happened to all the aged people who failed to gain admission to the care of the special homes. He felt that as yet many parts of Australia had no positive approach to the problem of the treatment of the aged. The British Medical Association report published in England advocated full diagnostic investigation of the aged before they were admitted to any special institution. It was felt that some at least of them should pass through a general hospital, both for their own sakes and for the sake of providing special experience for nurses and medical students. The ideal plan for a geriatric department would consist firstly of wards exclusively for geriatric patients undergoing investigation and treatment, and secondly of resident homes for those in need of housing but not requiring particular nursing care. There was no point in just retaining old patients in general hospital wards. Colonel Elliott asked what was the best long-range plan for Australia, to put old people to bed with the inevitable result of increasing stiffness and ultimate death, or to tackle the problem in a positive way, keeping the old people on their feet in the winter of their lives.

CUNNINGHAM DAX (Victoria) emphasized that geriatrics in Great Britain was not the product of the National Health Service; it had in fact suffered in the early stages

of institution of that service. He considered that vitamin B deficiencies were important and often overlooked; they were apt to arise particularly when sulphonamide treatment was being carried out, and also in older people addicted to alcohol. Vitamin B deficiency was possibly responsible for post-operative confusional states. In his opinion more single people, widows and widowers broke down psychologically in their old age than married folk. He wanted the atmosphere created in which people in their sixties and over should feel that social provisions were theirs as a right. The mere prolongation of life and the improvement in physical well-being were not enough if there was at the same time social neglect. Instead of compulsory retirement at sixty or sixty-five years, there should be some sort of department for drafting over-age people to other occupations; their work although slower was often remarkably accurate.

MISS A. PLAYER, the senior almoner of the Alfred Hospital, pleaded for more adequate provision for domiciliary care for old people who preferred not to go to institutions. However kindly treated they were in institutions, many of these folk preferred their own freedom and homes. She said she would like to see operating in Australia what happened in parts of Great Britain and America, where the staff of certain old peoples' homes operated an excellent domiciliary care service. Miss Player went on to say that there were advantages in the development of municipal responsibility for the aged so that they could remain close to their former surroundings. This meant also that young and middle-aged people in the community would feel old age as part of the normal fabric of everyday life and part of their own responsibility; similarly, the patients in the old-age institutions could then continue to have a share in local district activities.

W. S. DAWSON (New South Wales) referred to the number of instances of elderly people living alone who came to an untimely death because of accidents. Home care and visiting could perhaps help to prevent this in some cases. He hoped that constructive action on the problems of old age would follow the present meeting.

J. F. AKEROYD (Victoria) thought that the conditions in Australia were in many ways different from those in Britain, in that the standard of general practice was higher; most elderly folk were reasonably well investigated before being sent to a general hospital, and if they were so despatched they really needed medical care. He did not think that many hospital beds in Australia were likely to be occupied by elderly folk merely because they were old.

F. W. R. LUKIN (Queensland) made two points with regard to the surgery of elderly folk: the first was that the surgeon should take care that the benefit he hoped to confer was comparable with the risk he expected the patient to take; the second was that for the proposed operation he should have not only the approval of the patient, but his desire to submit himself to it.

MARY DE GARIS (Victoria) said that she spoke from the point of view of family life. She thought it very necessary for elderly people to be educated so as not to be so demanding and selfish; on the other hand daughters tended frequently to boss and restrict their old relations, and they should be taught to humour them. It was good to get old people to accept responsibilities within their capacity.

Dr. McCutcheon, in reply, said that patients were reasonably well sorted by the time they arrived at Mount Royal and were usually accompanied by a satisfactory medical certificate. Patients more suitable for a general hospital were at once sent there. Good feeling prevailed between the hospitals and the Home with regard to transfers backwards and forwards.

Dr. Edwards agreed with Dr. de Garis that demanding elderly relatives were a real problem, but he thought the problem arose because as they grew older they gradually divested themselves of all interests other than themselves.

In concluding the discussion Dr. Johnston, from the chair, emphasized that individual old people were both better and happier if they were allowed to work, and

definitely lived longer under those conditions. He said that further consideration was needed of the question whether the community could any longer afford to be without the help that old people could give to it. There was much work to be done and they wanted to do it. The Department of Social Studies of the University of Melbourne, with the help of the Nuffield Foundation, was still conducting an inquiry into the problems of old people in Victoria and he felt that their report when published would be a most valuable contribution.

CLINICAL PROBLEMS OF THE MENOPAUSE.

A PLENARY SESSION was held on the subject of "Clinical Problems of the Menopause". The chairman was BRUCE T. MAYES (New South Wales).

The Use and Abuse of Hormones.

J. W. JOHNSTONE (Victoria), discussing the use and abuse of hormones in the therapeutics of the menopause, said that the menopause was an epoch in the female lifetime involving much more than the loss of the outward sign of the menstrual flow. It was the period intervening between the initial decrease in ovarian function and the establishment of a new equilibrium. The prime cause was ovulatory failure producing hormonal imbalance. Oestrogens were the rational hormones for therapy in the relatively few cases in which it was needed, although measures other than hormones should be used. There were definite disadvantages of overdose because of their growth-stimulating and haemorrhagic effect on the female genital organs and the particular susceptibility of the menopausal patient to "toxicity". Oestrogen overdosage was now a recognized cause of bleeding met with in gynaecological practice. In the selection of patients for treatment the occurrence of hot flushes was the outstanding symptom. Their rather sudden and clear-cut onset, their radiating distribution from the bosom outwards, and their tendency to waken the patient from sleep, distinguished them from nervous turns. Reduction in the number of daily flushes served as the most useful guide to dosage, and unless they were reduced there was usually not much subjective improvement. The most useful oestrogens were tablets of ethinyl-estradiol and stilboestrol. A start might be made with a small dose, which could be increased weekly till the optimum effect was reached. That amount was then used in interrupted courses and for a limited time, the purpose being not continuously to substitute for the deficient gonad, but merely to "let the patient down" more gently over the transition period. Androgens alone in combination with oestrogens were finding some place in treatment, and the search went on for a sterol with pituitary suppressor action without adverse somatic effects.

The Menopause and the Depressive State.

G. B. MURPHY (Queensland), discussing the menopause and the depressive state, said that different experiences and interests in medicine would result in observers being impressed by particular aspects of the menopausal syndrome. In a practice that was mainly referred, the psychiatrist was likely to meet his own specialty. Experience had suggested that the basic cause of the menopausal syndrome was a primary biochemical disturbance, and that the various emotional and mental changes were secondary to that change in function. The psychiatric aspect reflected the fundamental disturbance through the function of the mind and was not a primary disturbance of thinking. The syndrome had been observed as a state of emotional depression in which lack of energy and interest, lack of confidence and a tendency to look upon the worse side were constant and basic reactions. The previous personality of the patient would somehow determine the particular type of variation that any one individual would show. The disturbance might vary from a mild subjective condition to a gross psychotic reaction. It was suggested that the menopausal depressive reaction was not one peculiar to that time of life, but

should be seen with a wider understanding of depressive states in general. In accordance with the natural history of the illness, the condition underwent spontaneous remission after an unpredictable period. Treatment was mainly symptomatic and should be determined by an appreciation of the limitations that the sickness imposed.

The Use of Synthetic Oestrogens.

PROFESSOR E. C. DODDS (United Kingdom) spoke on "The Use of Synthetic Oestrogens in the Treatment of Menopausal Symptoms".

The Treatment of the Menopause at Home.

EILEEN KENT HUGHES (Armidale, New South Wales) said that the responsibility of the general practitioner to his patients who were undergoing the menopause was to watch for early signs of disturbance and to advise them how to pass through that period without upsetting themselves or their families. It should be emphasized that the menopause was a normal process of life. When a woman in her forties came for advice, she should have that natural phenomenon explained to her, and be told that though her sex glands were atrophying she was not ill. She should be warned of the variations in the character of the menopause and reassured about the nature of vasomotor disturbances, which were generally controlled by small doses of stilboestrol. Many women were depressed or irritable during the menopause, but the extent to which their health suffered depended largely on their environment. The average woman at that time sighed for the youth that was no longer hers; the single woman mourned in her heart because she could never bear a child; the married woman was often conscience-stricken over pregnancies that had never occurred or feared the loss of sexual desire. Such fears and desires caused emotional tensions often not expressed but repressed. The cooperation of the husband was needed at those times, and though many husbands were too self-centred to be of any assistance, others had just been thoughtful. The home of a middle-aged woman was often a dreary place. Her children were out in the world, her husband was absorbed in his business and his sport, and she was regarded as just part of the furniture. It was the conscientious housewife who often broke down, not the woman with outside interests, some of which might not be entirely innocent. A wise physician would point out to the lonely mother that now she had raised her family she could devote herself to the many causes and activities that were waiting for capable women. In fact, she could be a citizen of the world instead of being monopolized by household cares. Of course, there were many devoted and thoughtful husbands, but their wives rarely went and wept in doctors' surgeries. A different line of approach was needed with the single woman. If a woman was happy and absorbed in her profession or business, she did not worry about the menopause. However, those in responsible positions needed to be cautioned against overwork, and to be reminded that they could no longer frisk round like young colts. They had to be prepared to fill the satisfying roles of being the wise women and rulers of the tribe. The single women who gave trouble at the menopause were those whose lives had been clouded by unhappy love affairs, and those who had devoted their lives to aged and helpless relatives. The first group needed sympathetic guidance and the awakening of their latent sense of humour. The second had to be assisted to assert themselves and take their part as citizens. Dr. Kent Hughes, in conclusion, urged doctors to teach their patients to regard the menopause not as the grave of youth but as the gateway to a joyful maturity and a serene old age.

Clinical Problems of Artificial Menopause.

CLEMENT L. CHAPMAN (New South Wales), in discussing the artificial menopause, said that the two characteristics of artificial menopause were the suddenness of its onset and the fact that its subjects were younger than those of the natural menopause. The symptoms of artificial menopause were more prolonged, more severe and more difficult to control. The symptoms of irradiation menopause were especially severe. Those of surgical menopause were

governed by a number of factors. When a process of disease had for some time destroyed most of the ovarian tissue, the patient would usually experience very mild symptoms. The age and marital state also had a profound effect upon severity and psychical symptoms. Flushing, sweating, loss of libido and premature senile shrinking changes were special symptoms of the artificial menopause. Dr. Chapman went on to say that preventive treatment of artificial menopause was all-important. Unnecessary removal of ovaries in surgical treatment should be avoided, and irradiation therapy should never be employed when a surgical procedure was possible. Every effort should be made to avoid interfering with the capability of the passages for coitus. Subtotal hysterectomy, which left a secreting cervix and a normal vaginal vault, should always be performed unless the cervix was unhealthy. Treatment was hormonal, sedative and psychological. In hormonal treatment, oestrin, the natural oestrone, would prove most successful. In some cases thyroid was important, especially combined with vitamin C. Psychological treatment was of the greatest importance, its object being to encourage the patient to a positive, full life.

Discussion.

DORIS C. GORDON (New Zealand) said that in New Zealand the menopause appeared to occur later than it did in Australia. With respect to flushes, patients complained more of the heat instability, commencing with limpness and followed by the heat-wave, which produced a good deal of fear. This was overcome by reassurance and by pointing out that grandmother and auntie coped with such troubles by using smelling salts and *sal volatile*, and managed to live to a ripe old age after all. She had observed that menopausal women put on too much weight and developed anginal symptoms and fear of heart disease, which always subsided with dieting and weight reduction. She always interviewed the husband when dealing with a case of menopausal disturbance. In considering the problem of menopausal symptoms in the spinster, Dr. Gordon said that that class of women filled the professions of nursing, teaching *et cetera*, and deserved consideration because of their potential motherhood. They could be reassured by being told to keep up their sense of humour and sense of proportion. She recommended conservatism in surgery, and said that she had seen very few instances of carcinoma of the residual cervix.

L. W. GLEADELL (Victoria) questioned Dr. Chapman's statement regarding conservatism in surgery of the ovary and cervix.

Dr. Chapman, in reply, said that in his experience it was very rare for carcinoma to develop when healthy tissue was left.

R. E. S. CHARLTON (Victoria) added to Dr. Kent Hughes's remarks that the role of the general practitioner must include a careful gynaecological examination of the patient during the menopause to exclude neoplasia. Dr. Kent Hughes said that she agreed. She also asked Dr. Chapman about the treatment of ovarian cysts found incidentally at other abdominal operations. Dr. Chapman considered that that was a difficult question to answer, and said that in young women particularly he was inclined to leave the ovarian cysts alone.

P. C. THOMAS (Perth) asked whether it was correct that ovaries atrophied soon after hysterectomy.

Dr. Johnstone said that the menopause did occur relatively earlier in patients who had had hysterectomy, which suggested that the ovary did atrophy more quickly after the operation; also that cysts tended to occur in the ovary, and that unless they increased in size they should not be interfered with.

H. T. ILLINGWORTH (Western Australia) asked Professor Dodds if ergotamine tartrate played any part in the treatment of the menopause.

Professor Dodds replied that it had no hormonal effect, and he was unable to state any other effect.

Professor Mayes, in his summing up, said that in 12% of women the menopause occurred between the ages of thirty-six and forty years, in 26% between forty-one and

forty-five years, in 41% between forty-five and fifty years, in 15% between fifty and fifty-five years, and in 6% before and after those ages. It appeared to occur early in sterile women and in women of the black races, and in association with cold climate and with poor nutrition. It also appeared that if puberty was early, then the menopause was late, and that the menopause occurred earlier if the uterus had been removed for disease. It also happened that the menses could return after an apparent menopause. He cited a case of a woman who had the menarche at the age of twenty years; she had a first child when aged forty-seven years, menstruated regularly until she was aged sixty years, and in that period had seven children. Her menstrual periods then ceased for a number of years, but later returned. Professor Mayes also said that pregnancy could occur although the menses had ceased. It would seem that there was a physiological basis for the treatment of menopausal symptoms by hormones, although care must be taken because of the ill effects of overdosage, and that there was a field for the combined use of oestrogens and androgens. It would also seem that the synthetic oestrogens were as effective as the naturally occurring ones, but that stilboestrol and hexoestrol had toxic effects because they were stable substances. On the other hand dienoestrol had less toxic effect, as it was a relatively unstable compound. Professor Mayes went on to say that the mental changes in the menopause would seem to be secondary to basic biochemical changes, and that after an unpredictable time there was usually a natural remission. It would seem to be better to help the patient over her troubles rather than to adopt vigorous measures. Patients should be reassured that the climacteric was not the end of useful life, but the gateway to joyful maturity. It would also appear that the artificial menopause was more severe in youthful patients, and that the evidence showed little incidence of neoplasia developing in healthy tissues; therefore conservatism should be practised in gynaecology when ovaries and cervixes were healthy, to assist a woman to continue as a happy marital partner.

PRURITUS: GENERAL AND LOCAL.

A PLENARY SESSION was held on the subject of "Pruritus: General and Local". The chairman was W. S. DAWSON (New South Wales).

Pruritus: Diagnosis.

I. O. STAHLE (Victoria), who considered the question of diagnosis, began by defining pruritus; he discussed early itch sensations of childhood in order to establish the concept that scratching was a natural and conditioned reflex to skin irritation. He suggested that the term "psychosomatic" should be used to imply that "the influence of total environment and the patient's reactions thereto should each be considered as increasing or decreasing the patient's inherent liability to any disease process". It was suggested that scratching might grossly alter the subjective and objective manifestations of skin disease, and that the degree of disfigurement produced was a fairly reliable index of the success or failure of management. Dr. Stahle then classified itching skin disorders under three headings: (i) pruritus associated with defined and visible skin diseases which usually itched—for example, eczema, urticaria; (ii) pruritus associated with defined and visible skin diseases which usually did not itch—for example, psoriasis; (iii) pruritus of which the usual visible manifestation was reaction of the skin to rubbing and scratching—for example, localized neurodermatitis, parasitophobia. He said that the merit of the classification was that consideration was given to the emotional state of the patient in relation to the clinical appearance and possible underlying internal medical disorders. Dr. Stahle then discussed the nervous mechanism of itch from a physiological angle, and gave clinical observations in order to indicate that much more knowledge of "itch" and "the itchy skin phenomenon" would be derived from patients if, in simple experiment, the right questions were asked.

Pruritus: Everyday Problems.

J. J. SEARBY (Victoria) dealt with the commoner conditions seen in general practice in which itching was the predominant symptom. He said that eczema and its near relations and the urticarias formed the largest group. Chronic eczema was one of the great bugbears of general practice, mainly on account of the fact that the patient either could not or would not leave off work. It seemed certain that those conditions which could be treated by complete rest cleared up more rapidly. Amongst other things, *tulle gras* had been found to be a useful dressing, while the most helpful drug seemed to be phenobarbital. Dealing with infantile eczema, Dr. Searby said that he thought the emphasis had swung too much to the allergic side, rather to the neglect of local treatment. Urticaria had a much more cheerful outlook, since the cause was much more readily determined; but there still remained some urticarial conditions with an indefinite basis, which might perhaps be described as true "nerve rashes". The localized forms—*pruritus ani* and *pruritus vulvæ*—were both very distressing conditions. The former was frequently associated with generalized eczema, and X-ray therapy seemed to be the most efficient form of treatment. *Pruritus vulvæ* was due to various causes; the menopausal type seemed to be the most responsive to treatment, especially with stilboestrol. Some very difficult cases occurred in unmarried girls; they were possibly hormonal in origin, but the condition was very difficult to treat satisfactorily. *Dermatitis herpetiformis* was possibly one of the most baffling conditions of all, owing to the inability to prevent relapses. Dr. Searby finally made a short reference to rashes due to deficiency diseases among prisoners of war in Singapore. He said that he believed that more research on that type of rash could prove to be of value.

Pruritus and the Industrial Medical Officer.

DOUGLAS GORDON (Queensland) discussed pruritus from the point of view of the industrial medical officer. He said that most patients suffering from industrial dermatitis presented with an "itchy" skin; the cause for the complaint might be an irritant which affected nearly all exposed to it in a mass "epidemic", or it might be an irritant or sensitizer which affected only odd subjects. People in industry could suffer from all the skin diseases to which the flesh was heir. In consequence, in any investigation it was the usual thing to find only one or two employees suffering from "occupational itches"; a number of others with allegedly industrial itches turned out to have scabies, psoriasis *et cetera*. Sometimes neurotics and occasionally psychotics blamed their work for their itchy skin. With the permission and help of the State Government Insurance Commissioner (Queensland), a dissection of workers' compensation claims due to occupational skin disease made in Queensland in 1951-1952 (288 patients) gave an incidence of approximately 0.7 per 1000 employees. The main causes were: cement (49 patients), sugar cane (35), petroleum products, mainly used to remove grease from hands (30), alkalis—cleaning powders and soaps (30), sawdust and timber saps (23—mainly cases of sensitivity), fruit juices (13), wet conditions (8). There was a large group due to miscellaneous causes (54), in which there were almost as many causes as there were patients. In 198 cases the lesions commenced on the upper limbs, mainly the hands, and in 53 on the lower limbs, mainly the feet. In only 46 cases was there spread from the original site of onset. In the great majority of cases the condition quickly cleared up when the patient was taken away from work for a short period. Dr. Gordon finally gave the following average duration of disability: (a) for patients whose lesions did not spread, 29.79 days; (b) for patients whose lesions did extend, 49.89 days.

Psychosomatic Aspects of Pruritus.

ALEX SINCLAIR (Victoria) discussed psychosomatic aspects of pruritus. He said that he wished to indicate how the psychiatrist might help the dermatologist in the diagnosis and general management of dermatoses which had itching as the chief symptom. Attempting to define the

term "psychosomatic", he said that there was no suggestion that a psychosomatic disorder was entirely or even predominantly psychological in its aetiology. The concept embraced the consideration of all the known interrelated physical, chemical and psychological factors which brought about a state of ill health. Thus, dermatologists and psychiatrists must work on the problem in combination and not in isolation. The psychiatrist was occupied mainly in the field of unconscious conflict and of exogenous causation of emotional disorder. The dermatologist dealt mainly with the external dermal manifestations of disease. Both were concerned ultimately with what the patient felt or complained of. In pruritus, the problem common to both was one of the perception of itch. In the delineation of a common field of interest, an understanding of the mechanism of perception of itching was important. Dr. Sinclair referred to recent experimental work in this field. He went on to mention two kinds of evidence in relation to psychological influences in dermatosis. The first, he said, concerned the concept that the skin acted as a screen which stood between the inner mental and physical functioning of the individual and his environment. It revealed to the outside world what was occurring within the individual and responded to stimuli of various kinds in the external environment. The second form of evidence came from psychological evaluation of persons suffering from dermatosis. There appeared to be no particular personality type more prone than another to develop a dermatosis, nor could any particular type of dermatosis be correlated with a specific personality type. Dr. Sinclair quoted a report from the psychological examination of 137 patients with various types of dermatosis; evidence of severe maladjustment within the family group was found in 57% of cases, and evidence of maladjustment in early life in 62%, but evidence of recent emotional trauma in only 12%. Follow-up investigation of the 137 patients revealed no response to psychotherapeutic treatment in 26% of cases, symptomatic improvement in 27%, relapse in 17.6%, and cure in 29.4%. Dr. Sinclair referred to detailed studies on the psychological mechanisms at work in cases of self-inflicted dermatosis, and said that the findings indicated that very powerful emotions arising from mental conflict might be discharged through an attack upon the skin surface. The discharge was often complete and had the effect of solving the conflict for the sufferer so that he might not present the other more easily recognizable psychic or somatic manifestations of neurotic disorder. The psychiatrist had to examine the total life situation of the patient and to assess what factors could be responsible for anxiety, inferiority, guilt, depression or sexual conflict. He must also detect deep-seated aggression felt towards figures in the patient's environment which could be satisfied only by the attack upon the skin surface. It was useful to inquire into early parental influences on the patient, and into relationships with siblings. In relation to sexuality, the most important aspect appeared to be the development of emotional attitudes to sex. A general evaluation of the personality structure should be made, with an assessment of the individual's ability to live in harmony with his environment, and some idea should also be gained of the patient's intelligence. Dr. Sinclair said that relevant life experiences which provoked anxiety or a sense of guilt would, if repeated, activate original patterns of anxiety or guilt with exacerbation of the dermatosis. That helped the patient to realize the relationship between his emotional life and his skin symptoms. Treatment was most effective in patients who could readily assimilate the idea that their skin reacted to life situations as other organs did. During therapy the patient was allowed to ventilate his feelings and was taught to understand the problem and to handle his emotions. When a sense of unconscious guilt had caused depression and the guilt was expiated, as it were, by mutilation of the skin surface, electroshock treatment might be effective. When general tension was a principal feature, measures aimed at quick relaxation of tension (for example, spaced intravenous administration of "Sodium Amytal") might be of value. Generalized pruritus, *pruritus ani* and *pruritus vulvæ* were difficult therapeutic problems. Electroshock therapy might help. In conclusion, Dr. Sinclair

stressed the importance of the right approach to a patient suffering from a dermatosis when the dermatologist considered that reference to a psychiatrist was advisable. It was important, in the initial stages at least, that both dermatologist and psychiatrist should continue to interview the patient; otherwise a diagnostic vacuum might develop before the psychiatrist had orientated the patient's thinking to psychological cause and effect, with the danger of the patient's having the feeling of emotional rejection. The patient should also understand that further psychiatric inquiry was not necessarily directed towards extracting from him some dread secret of his personal life, but rather to correlate all types of stress which contributed to a feeling of unease or disease. The patient must have the conviction that he could depend upon his physician for emotional support as well as for physical medication.

Treatment of Pruritus.

J. WITTON FLYNN (New South Wales) said that the word pruritus came from the Latin *prurire*, to itch. It was applied to itching which was not accompanied by any obvious changes in or diseases of the skin, other than those changes provoked by rubbing or scratching. It was excited in everyone by some forms of irritation, but the intensity of the subjective phenomena varied a great deal in different people. What to one was mild discomfort was to another intolerable irritation. The fundamental rule of treatment should be *primum non nocere*. Topical applications were important. They not only kept the pruritus under control (which lessened the possibility of trauma, irritation and infection), but they helped to promote symptomatic improvement in pruritus of systemic disease—for example, icterus, leucæmia, diabetes. They contributed materially to the comfort of the patient, despite their inability to affect the underlying pathological condition. Lotions and cold packs were used for acute weeping lesions, creams for subacute lesions and hairy surfaces, and pastes for chronic conditions and non-hairy areas. All should be simple. Dr. Flynn mentioned the use of carbolic acid, of menthol (0.5% to 1%) in calamine lotion, zinc cream and Lassar's paste. Referring to oral treatment, Dr. Flynn said that some form of mild sedation was always advisable and nearly always necessary. Phenobarbital (0.5 to 1.0 grain) or bromides (35 grains) about half an hour before retiring were useful. An attempt should be made to ensure a good sleep for the patient. Most damage to the skin was done at night. Fractional doses of X rays (120r to 200r) were of great value, especially in areas of lichenification, *pruritus ani et vulvæ et cetera*. Hormones given by injection were often of benefit in cases of senile pruritus. It should be thoroughly understood that soap and water were bad for all inflamed skins. It should also be learnt that people with dry skins were not able to use soap and water with impunity. Those with oily skin more or less could do so. Local irritants should be avoided—for example, cold winds in the case of elderly people, antiseptics, chemicals *et cetera*. The local application of sulphonamides in any shape or form should be forbidden. The same warning could perhaps be given also against the local use of antihistaminics, which were nearly always irritant. Psychosomatic aspects were frequently present, either *ab initio* or as a result of generalized pruritus. Careful and sympathetic inquiry and reassurance were necessary.

Discussion.

CLIVE SANDS (New South Wales) considered that although diet was not the whole picture it was of importance in infantile eczema. He advocated the use of dilute hydrochloric acid in infantile eczema and adult pruritic diseases. Urticaria in small children often benefited likewise.

J. M. O'DONNELL (Western Australia) considered that prevention of industrial dermatitis was important. Certain types of skin should not be exposed to certain potential irritants; for example, the fair-skinned should not choose outdoor occupations, the individual with the acne type of skin should avoid work in oils and greases.

DENIS CLARKE (Victoria) considered that psychogenic factors played a real part in the initiation of pruritus.

The rubbing and scratching following on pruritus initiated eczematous dermatitis. In infantile eczema it was often of great benefit to treat the child away from its parents where possible, both parties benefiting from the experience. Dr. Clarke stressed the frequency of dermatitis of the face in various occupations in Victoria, and said that the irritants involved were frequently vapours and dusts, and the inflammation commonly commenced on the eyelids. He considered that in some of the cases referred to by Dr. Gordon either a wrong diagnosis had been given or treatment had been inadequate.

ARTHUR J. DAY (Victoria) emphasized the importance of remembering that X-ray therapy was not unattended by risk, and that it should be used only by those who had been properly instructed in its use.

Dr. Stahle, in reply, agreed with Dr. Clarke that the nervous state was frequently the trigger mechanism in the production of such conditions as neurodermatitis. However, it was not the fundamental cause *per se*.

Dr. Searby, in reply, said that it was not his intention to deny that allergic factors played a considerable part in the causation of infantile eczema, but he wished to lay stress on the tendency to overestimate the part played by allergy in that condition. In very few cases was infantile eczema cured by antiallergic treatment alone, but many patients were cured by local and other suitable therapy, including antiallergic treatment.

Dr. Gordon, in reply, said that the secondary industries in Queensland were not as highly developed as in Victoria and the other large States. Therefore industrial dermatitis was not such a frequent condition in Queensland.

THE MASS MANAGEMENT OF BURNS.

A PLENARY SESSION was held on the subject of the mass management of burns. The chairman was Major-General Sir Samuel Burston (Victoria).

Civil Defence Aspects of the Management of Burns.

SIR SAMUEL BURSTON (Victoria) discussed civil defence aspects of the mass management of burns. He referred first to the possible occurrence of large numbers of burn casualties from disasters in peace time as well as in war, and stressed the necessity for a set-up capable of dealing with such emergencies. He said that in wartime, owing to the great advances made recently in high explosive, incendiary and atomic methods of attack, mass casualties from burns had become one of the most urgent medical problems in the fighting forces and the civil community. Sir Samuel Burston referred to the comparative immunity from attack which Australia had enjoyed for the first 150 years of her history, and pointed out that, owing to the changing strategic situation and the great developments made in aircraft, in submarines, in long-range guided missiles *et cetera*, that immunity could not be expected to last any longer. It was therefore essential that as a nation Australia should be in a position to meet such a disaster with an organization that could cope efficiently with large numbers of casualties amongst the civil population. Any failure in that respect would have a disastrous effect on the morale of the civil community, which in modern warfare was as important as that of the fighting forces. The greatest emergency would be that created by an atomic attack.

Sir Samuel Burston said that the energy released by an atomic bomb took three forms—heat, blast and radioactivity. Of the several ways in which an atomic bomb might be used, only one, the air burst, caused mass burns, and therefore that was the only one he proposed to consider. When an atomic bomb burst, it produced a "ball of fire"—an incandescent sphere with an initial temperature above 300,000° C.—the thermal effects of which were all over in about three seconds. During that time exposed persons up to one mile from ground zero would receive burns sufficiently severe to require skin grafting; mild surface burns would be received at about two miles.

Persons trapped in burning buildings would suffer "flame burns". The relevant radiation hazard was loosely termed "γ flash"; γ rays were emitted by the fission products of the atomic explosion. After about one and a half minutes the fission products would have reached a safe height from the ground. Radiation injury from γ rays, which had its greatest effect on the immature blood cells and haematopoietic tissues, might occur up to about one and a quarter miles from ground zero. Few of the casualties would exhibit immediate symptoms; therefore all casualties from that inner zone should be assumed to have suffered radiation injury. Those who had been within three-quarters of a mile of ground zero should be assumed to have sustained severe radiation injury, a lethal dose in about 50% of cases. However, radiation injury was a relatively small part of the problem of dealing with casualties from an atomic bomb burst in the air, and the symptoms of radiation sickness would not appear for a few days up to six weeks; the major problem was therefore the handling of vast numbers of casualties from burns and trauma. The actual number of casualties would vary according to the density of population and the time of day; but the situation would be beyond the normal medical resources of the community in personnel, accommodation, transport and medical equipment and supplies. The civil defence organization for a metropolitan area was to be considered under those four headings. Doctors would be in short supply, and must therefore be used economically. The training of an auxiliary nursing service, of rescue and first-aid personnel and of scientists and technicians for work in blood transfusion was important. In view of probable damage to the main hospitals, suitable buildings on the periphery of vulnerable centres should be earmarked beforehand as emergency hospitals and provided with all necessary stores and equipment. Apart from the usual equipment, the most vital medical supplies for the treatment of mass casualties from burns were whole blood and its derivatives, blood substitutes and electrolyte fluids. Sir Samuel Burston mentioned the plans put forward by the Order of Saint John of Jerusalem and the Australian Branches of the Red Cross Society for the training of auxiliary personnel. He said that the Red Cross National Blood Transfusion Service, which was responsible for the supply of whole blood and its derivatives throughout Australia, could supply all normal peace-time needs, but could not cope with any but a foreseeable peace-time emergency. A plan had been submitted to the Commonwealth Government covering an extension of the service which would produce a reserve of 30,000 litres of blood derivatives *per annum*. This would require several years before a sufficient stockpile to deal with a major wartime civil disaster could be acquired; therefore the building up of a stockpile of blood substitutes would be required. If a major war was anticipated in the next few years, the proposed expansion of the blood transfusion service should be put in hand immediately.

Resuscitation as a National Problem.

R. J. WALSH (New South Wales) discussed the mass management of burns from the point of view of resuscitation. He said that any plan of preparedness for the management of burn casualties must be integrated into a broad plan of civil defence, but the following medical aspects should be included. (i) Organization: (a) evacuation and transport of the injured, (b) establishment of treatment centres, (c) supply of personnel. (ii) Medical management: (a) first aid, (b) resuscitation, (c) control of infection, (d) restoration of function. Prognosis had improved in recent years owing to advances in the treatment of shock, to a better understanding of salt and water metabolism, to the antibiotic era and to improved facilities for nursing care. The problem was how those advances could best be applied to hundreds of thousands of burnt patients under disaster conditions. Under such conditions the advantages of modern civilian hospitals would not be available; therefore therapy should be as simple as possible, and standardized. Dr. Walsh put forward the following general principles: (i) any adult with burns covering more than 18% of the body surface, and any child with burns covering more than 7.5%, should be

treated for shock as soon as possible. (ii) The chances of survival were more directly related to the area than to the depths of burns; survival was extremely doubtful under disaster conditions if more than 50% or 60% of the body was burnt. (iii) Control of intravenous therapy by haematological methods would be impracticable, and the amount of fluid required must be calculated from the area burnt. For this reason a knowledge of the area of the skin surface of the various parts of the body was essential, and was best obtained from a diagram. Fluid loss from the circulation of burn patients continued for about forty-two hours. The physiological state was appropriately restored by transfusions of serum, blood and saline. Dr. Walsh gave the following simplified and standardized formulae for calculating the amount of fluid to be administered: (i) for adults, 150 millilitres for each 1% of body surface burnt; (ii) for children aged over five years, one millilitre per pound of body weight for each 1% of body surface burnt; no formula was possible for younger children. It was generally agreed that the rate of administration should be 50% in the first eight hours, 25% of the total in the next sixteen hours and 25% of the total in the second twenty-four hours. The role of cortisone and ACTH in preventing fluid loss was not yet clear; and difficulties associated with their procurement and certain disadvantages made their use in wartime disasters impracticable. As blood and serum would not be likely to be available in adequate amounts, the use of substitutes for blood or plasma volume expanders must be considered. Dextran and polyvinylpyrrolidone, at present being investigated, seemed to be clinically satisfactory. One of them would need to be used under disaster conditions, and dextran was the more generally favoured. If blood or serum was available, the amount of dextran should be limited to six bottles per patient. It was often difficult to determine blood groups and cross-match blood of patients who had received dextran. Dr. Walsh went on to say that even by the simplified methods of resuscitation which he had outlined, they could not hope to deal efficiently with the victims of an enemy attack, owing to insufficiency of materials, personnel and plans. A plan of preparation should include the following general features: (i) in advance, stockpiling of serum or albumin, of dextran, and of equipment and training of personnel; (ii) at the time of the accident, mobilization of supplies and personnel, and collection of blood from donors. Medical graduates were generally inexperienced in dealing with extensive burns, and the inclusion of lectures and demonstrations on the subject in post-graduate courses would be of value. The establishment of a "burns centre" (Colebrook) in each capital city would help in training personnel and in allowing controlled trial of the principles of resuscitation enumerated. First aid and resuscitation treatment would have to be the responsibility of non-medical personnel, and therefore the training of nursing and first-aid groups should be undertaken. If incendiary or atomic attacks were even a remote possibility, the stock-piling of serum, dextran and equipment should be begun without delay. Blood might be needed in enormous quantities, especially if treatment of irradiation effects was required, and could not be collected from the area subjected to attack. Plans should therefore be prepared for mass blood collection in all parts of the Commonwealth immediately after the occurrence of a disaster. Dr. Walsh said in conclusion that the medical profession should be organized to care for numerous patients with extensive burns, whatever the cause; at present efficient treatment of only a few would be possible. However, the responsibility for organization and for the provision of materials rested with those in charge of the welfare of the community.

Organization of the Medical Services.

COLONEL W. D. REFSHAUGE (Victoria), discussing the organization of the medical services in the mass management of burns, said that there were at present several types of weapon in use apart from atomic weapons which might cause large numbers of burns; but they could be easily dealt with by any organization which was prepared for atomic attack. The use of the atomic bomb in warfare was controversial, but nowadays there were, according to

the Press, such things at atomic warheads for rockets and shells, and they might cause casualties approaching those caused by the bomb. The number of casualties to be dealt with after an atomic bomb attack in the army in the field would depend on the state of training, discipline and preparedness of the troops involved. As there had been no previous experience of such warfare, any number was purely conjecture; but it might include from 4000 to 8000 burn casualties. Colonel Refshauge said that the problems created were: (i) first-aid treatment, (ii) classification, evacuation and distribution of casualties, and (iii) surgical treatment and further disposal. First-aid treatment consisted of relief of pain, prevention of infection and dehydration and relief of shock. Classification was necessary to give priorities for evacuation, and would be into three groups: (i) severe; (ii) moderate, but requiring evacuation; (iii) mild. Those in the last-mentioned group would be needed to stay on duty and withstand the enemy in his anticipated "break-through". To carry out that task, small burns teams would be needed to go into the affected area to give first aid and classify casualties. Five such teams would be under the direction of a medical officer. The teams would consist of a non-commissioned officer, two nursing orderlies and one "general duties", and would have sufficient equipment to treat 100 casualties. They would come from the field ambulances, field dressing stations and casualty clearing stations not involved.

Colonel Refshauge, in conclusion, said that to be prepared for that type of warfare the following were required: (i) adequately trained personnel—both combatant and medical—for self-help schemes and to help comrades; (ii) an adequate stock-pile of serum, serum substitutes and other solutions for intravenous administration; (iii) firm direction for the treatment of burns. Those requisites must be ready before the threat of such an attack, if disaster and even defeat were to be averted.

The Laboratory Aspects of Mass Management of Burns.

JOHN PERRY (Victoria) discussed the laboratory aspects of the mass management of burns. He first considered the organization of the laboratory services that would be necessary in the event of burns casualties occurring in great numbers, and discussed civilian disaster and incendiary or atomic bomb attacks as possible emergencies. He referred to the magnitude of the problem, the very nature of which would limit the scope and demand for laboratory services, and pointed out that during the chaotic phase most aspects of medical treatment would be a compromise between improvisation and the ideal. At that stage laboratory potential would be concentrated on aiding the general medical services, especially personnel engaged in resuscitation. As order began to appear, traditional techniques would return, and the demand for the laboratory would reappear. Numbers of cases, based on experiences in cities where atomic bombs had been dropped, would require a very great extension of the laboratory services beyond those existing. A plan was suggested for the provision of such services, which would rely mainly on the use of mobile units, similar to those used by the Allied forces in World War II. The staffing and equipping of those units were clearly problems for deliberation and planning. Attention was drawn to the inadequacy of existing laboratories for the efficient handling of a sudden challenge by a large number of burn casualties from a serious civilian disaster. A plan was submitted which included a critical assessment of existing potential, together with a suggestion for preparing numbers of the foregoing units without greatly interfering with civilian economy.

A. E. COATES (Victoria), discussing surgical aspects of the mass management of burns, said that mass burning might be expected in modern full-scale war. All the resources of medicine would be taxed. Australian medical men might not be required in the country to deal with the problem, but their services abroad would be needed. All doctors should know something of the modern treatment of burns. Organization of medical and lay personnel would be of prime importance. Instruction in first aid should be given to all adults in the community so that

they could help themselves. The community should be tested for blood groups and labelled accordingly. Blood "on the hoof" would thus be available in great quantity. Civilians should be trained in infusion, transfusion and the giving of morphine, which should be at hand in large quantities. Morphine and drinks would be welcomed by the doomed. The selection of patients for treatment would be important. First-aid dressings, when required, would be part of the elective treatment of the burn. Organization would be the keynote. Treatment should be simplified and given a chance; those giving treatment should act under orders as would the fireman. Shock would be the most important element to combat. The "rule of 9" of Berkow was a useful guide in planning intravenous therapy; burns covering 15% or more of the body surface required intravenous fluid administration. Dr. Coates then quoted Evans's formula for estimation of the amount of plasma or substitute required in the first twenty-four hours. Whole blood was required in the treatment of patients with deep burns, and in the later stages of all extensive burns. In an atomic catastrophe blood would be necessary in large quantities. Local dressings could be a single piece (thick absorbent material) as supplied to the army for limb and body burns. The open treatment (no dressing) should be used for face, neck, perineum and buttocks. The open or exposure method would obviously be extensively used. ACTH and cortisone would be of help in controlling hyperthermia in the later stages. Antibiotic therapy would be applied as circumstances permitted. *Débridement* would not be possible. Sloughs would be treated in the later stages by appropriate methods, and skin grafting would be carried out extensively under the direction of specialists. Irradiation burns would present a problem insoluble at present.

Dr. Coates, in conclusion, said that in a time of great emergency there would be need for a combination of sense and sentiment—a realization that many patients could be killed by too energetic treatment, but that many left to Nature might recover. An organized medical profession could salvage many from the wreck.

Discussion.

C. DAVIS (New South Wales) said that in his opinion a résumé of the lecture should be sent to all the doctors throughout Australia. This would then give those who had not attended the Congress a chance to consider all the important points which had been raised at the meeting.

A. E. SHAW (Queensland) said that there was one point that he felt should be emphasized in view of the present centralization of population and doctors in Australia. He had had experience based on 300 cases of burns. He also said that in his opinion in teaching hospitals where few burns were treated multiple investigations should always be carried out. That multiplicity of investigation was excellent for the training of young residents, who later in life would have to treat burn patients with little or no pathological help. That would then allow them to receive training in the fluid disturbances in the first forty-eight hours after the burn had been received, and they would eventually be able to dispense with many of the tests. The medical officer who had treated burns in the Lamington disaster (Dr. Shaw himself) in New Guinea said that those who turned to watch the explosions were often so severely burnt that, like Lot's wife, they stayed, whereas those who turned and ran and did not stay received burns of less severity. In that disaster there were 70 patients admitted to hospital for treatment under one medical officer, there were no laboratory facilities, and there was only a minimum amount of plasma or serum available. Little blood was used, but there was an adequate supply of electrolytes. Out of the 70 patients, only three had died. Dr. Shaw was now of the opinion that, under similar circumstances, he would use more blood than had been used for those patients. He would also expect to save most patients with less than 50% of the body burnt, with a minimum of laboratory and nursing facilities.

L. E. LE SOUEF (Western Australia) said that the matter under discussion should not be allowed to stand still, and that the problems raised by the readers of the papers

should be followed up. At the Royal Perth Hospital treatment had started with a burns team working in association with a resuscitation team—in other words, there was now a burns centre. Dr. Le Souef recommended that such centres should be expanded into the larger country towns, and that in both the city and the country centres the resident medical officers and other personnel should be trained so that men could then be sent to the regional hospitals with the increased knowledge and experience to be in position in cases of emergency or for the treatment of civilian burns. Dr. Le Souef said that he would recommend that water should not be given in the first day or two, but rather that fluid containing sugar, bicarbonate *et cetera* should be made available. If spraying of a burn with powder and keeping it dry was used—in other words, the open method of treatment—the patient must be kept warm and not unduly exposed to the cold air such as Melbourne at the present time. He had seen a large warm room used for that purpose in Edinburgh, where the patients having the open method of treatment were quite comfortable. Dr. Le Souef was in favour of simple methods being standardized, and thought that such methods should be propagated to all the medical people throughout Australia.

B. K. RANK (Victoria) said that emphasis should be laid on the teaching of the lay personnel in the hospitals, especially the orderlies. Previously emphasis had been on the teaching of the medical officers, but the orderlies played a most important part in the treatment of burns patients. It was, however, very difficult to get the necessary experience for them, and he suggested that army huts similar to those in use in the army camps at the moment should be used in association with one of Dr. Perry's pathological units. If a burn patient was now admitted to the wards of a teaching hospital, there was a considerable increase in the amount of work in the ward perhaps to the detriment of other patients, whereas if three or more patients with burns were admitted to the ward of a teaching hospital, there was almost a chaotic condition. Dr. Rank also recommended the stock-piling of materials as the speakers had previously mentioned, especially those materials required for intravenous therapy. He pointed out that the dressings decided on for such stockpiling should be sufficiently large so that they would stay in place, the dressing being like a graft—no use if it did not stay on. He pointed out that no elastic or crêpe bandages were made in Australia at the present, although they were now being made in more than one factory in Great Britain. He strongly recommended that such bandages should be manufactured locally.

D. McKELLAR (Mooroopna, Victoria), said that one of the most valuable pieces of equipment of stockpile would be the Julian Smith blood pump. He said that 1000 of them could be stockpiled and used for giving immediate blood transfusions to the injured on the spot. He also said that current ideas as to the storage of blood could then be changed, because so much blood would be immediately available. There would also be less need for the accumulation of large stockpiles of serum. Such use of direct blood transfusions would obviate the need for many transfusions with serum. There would then be less wastage of the red cells, for it took about two and a half pints of blood to make one pint of serum. He suggested that more personnel be trained to take blood on the spot, and then there would only be the need for other solutions such as Ringer's and Tyrode's solution. He suggested devising a smaller pump than the standard Julian Smith pump, perhaps out of a lighter material, and that, together with other sterile apparatus, could be kept in the pocket, sterile and readily available.

E. B. DREVERMANN (Victoria) said that Dr. McKellar's statement was hardly applicable to burns because of the rapid haemoconcentration which occurred soon after the injury. As the Royal Melbourne Hospital Dr. Drevermann often found readings of up to 120% or 130% haemoglobin value within a few hours of the burn, and therefore extra transfusion would be dangerous if carried out at that stage. Dr. Drevermann also said that he did not think that any formula was really applicable for estimating the amounts of serum, blood or other fluids required in a single case.

In practice he had found that the amount varied from any formula, and it was difficult to treat a patient on such a formula. It also varied if a patient was given cortisone or ACTH. Dr. Drevermann also pointed out that treatment based on the estimation of chloride lost in the urine was apt to be confused if cortisone or ACTH was also given.

J. LANE (Victoria) said that he had found that there was always the desire of the patient or friends to apply something to the burn, the material used often being inappropriate, and there was also the great desire of many people to give therapy to the patient which, if it did little harm, was still not to be condoned. Dr. Lane said that he was in favour of making some preparation such as dibromopropamide, which would be standardized for application to burns.

Dr. Coates, in reply, said that he had had no experience with that drug, and that if something must be applied to the burn he would recommend a sterile dry dressing. If a drug was universally used, it would come to be regarded as a panacea, and in his opinion greasy dressings could be harmful. The sterile dressing such as the army field dressing was to be preferred. A formula for estimating the fluid requirements was not for individual use, but rather for use in times of chaos, otherwise blood and other fluids would be wasted if left to individual choice. Under such circumstances he would call on Dr. Drevermann to provide the necessary formula.

GEORGE BELL (New South Wales) said that he was in support of the need for promulgating the knowledge contained in the papers read at the meeting to the practitioners throughout Australia. The medical profession generally in his opinion were ignorant of what would happen with an atomic attack. He supported ruthlessness in the sorting of patients after an atomic attack, and said that it would be more necessary than it had been in the last two wars. Dr. Bell agreed that mobile pathological units were probably the solution to the problems raised by Dr. Perry. The larger units in the static hospitals at present would possibly be put out of action, and mobile units could do a lot to assist the medical officers in the treatment of those casualties.

K. HIRSCHFELD (Queensland) said that if there was a mass disaster, it would be necessary to rely on many people to help, and he was in favour of self-help as far as possible by the patients. He therefore recommended that cards be printed in simple language, on which a description of how the burn would be expected to behave and how it would heal should be printed. The cards would be given to the injured.

S. WILLIAMS (Victoria) asked if it was ever safe to give blood transfusions without direct typing. He said that at present it seemed that ACTH could be of some value in some cases of burns.

Dr. Walsh, in reply, said that it was negligent if transfusions were given without cross-typing in times of peace, but in crises and in chaos it would be negligent to delay the treatment while cross-matching of blood was carried out. The circumstances must be considered.

C. W. GALE (Victoria) said that it was his impression that in civilian life, when blood was given for elective operative procedures, no plain attempt was made to get the patients to be donors in the future. He considered that there was considerable moral obligation for patients if possible to replace the blood. He was interested to know if an approach was made to the patients and their relations. He envisaged in the future a legal obligation on the part of the patients or the next of kin to give blood; but if the patient was unfit to be a donor or died, he could see that there would be various troubles.

Sir Samuel Burston, in reply, said that that policy had been pushed with very little success.

LUCY BRYCE (Victoria) said that all public and most private patients were asked to replace the blood they had received, but that a survey of some hundreds of donors some years earlier had shown that only 10% of them had accepted the moral obligation.

A. R. WAKEFIELD (Victoria) pointed out there were dangers in transporting many burn casualties to buildings

at the periphery of the city. If such a policy was followed, they would be back to the days of the lying-in hospital of the pre-Pasteur and pre-Lister eras. There would be great cross-infection with streptococci, and he agreed with Colebrook that these patients should be put on the balconies or laid out in rows with a head-cover for the patient. He would arrange cover for the patients either prior to the disaster or subsequently. Dr. Wakefield did not consider that laboratory services entered into the mass treatment of burns until the days following the disaster. He would supervise treatment by clinical methods only, using orderlies to give the infusions. He would perhaps leave the patients with catheters tied in, and then from the output of urine, the pulse rate records and the haemoglobin value estimated by simple methods he would rely on clinical observation to determine the treatment necessary. He did not consider Dr. Perry's methods practical in the first forty-eight hours, which was the time that determined whether the patient would live or die.

P. R. DELAMOTHE (Queensland) noticed that emphasis had been placed by the various speakers on the complete lack of stockpiling. He therefore considered that the Congress should give a lead in overcoming that deficiency. Stockpiling of training concerned those present, and he agreed that self-help would solve a lot of the troubles. However, any training must also include country people and not those limited to the larger centres. Some simple formula for treatment and training through Saint John Ambulance or the Red Cross Services would seem to be ideal.

C. B. COX (New South Wales) said that every effort should be made to have the papers published *in toto* in THE MEDICAL JOURNAL OF AUSTRALIA.

Dr. Cox moved the following motion:

"That this meeting recommend to the Federal Council of the British Medical Association that the attention of the Federal Government be drawn to the total unpreparedness of Australia to deal with

a national disaster, especially of atomic nature, in that there is no material supply, there are no resuscitation centres and there are few personnel trained in the treatment of burns or shock, and that the Federal Government be asked to implement as a matter of urgency the stockpiling of material supply, the establishment of resuscitation centres and the training of personnel in resuscitation measures.

C. M. RENOU (Victoria) seconded the motion, which was carried unanimously.

A. J. METCALFE (Canberra) pointed out that a central planning committee had already been set up to deal with drugs, dressings, instruments *et cetera*, and to determine what was available in Australia. He said that he would not like it thought that nothing had been done. Some drugs such as morphine and cocaine were in rather short supply, but others were available in considerable amounts.

E. V. KEOGH (Victoria) suggested that it should be put to the Government that those present as a Congress would take steps to meet the emergency if it did arise.

A. E. SHAW (Queensland) spoke again. He said that a shortage of some drugs was to be expected, and would strongly support the motion.

Sir Samuel Burston summed up the discussion and papers. He said that the papers showed that they were unprepared, and that they must take action along certain lines, such as the training of personnel to help in resuscitation, for without that stockpiling would be useless. However, that would take a long time. He would agree that there was the necessity for an increased reserve of blood derivatives and blood substitutes. Blood derivatives were extremely urgently required, and a start should be made immediately. He considered that financial cover for that work should be made available urgently by the Government. He would also agree that burns centres were very important, and would give some individual body an authoritative position to educate the medical profession

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED SEPTEMBER 6, 1952.¹

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism ..	5(1)	..	..	..	..	..	..	..	5
Amoebiasis
Ancylostomiasis	36(31)	..	..	..	..	..	36
Anthrax
Bilharziasis
Brucellosis
Cholera
Chorea (St. Vitus)
Dengue
Diarrhoea (Infantile)	15(15)	..	..	..	1	..	16
Diphtheria ..	6(3)	4(3)	4(2)	..	6(5)	..	..	..	20
Dysentery (Bacillary)	1(1)	..	3(3)	..	..	..	..	4
Encephalitis	1(1)	..	..	..	..	1
Filariasis
Homologous Serum Jaundice
Hydatid	1	..	..	20(13)	..	..	..	20
Infective Hepatitis	1	..	..	..	..	..	1
Lead Poisoning	1	..	..	..	1
Leprosy
Leptospirosis	1	..	..	..	..	..	1
Malaria
Meningococcal Infection ..	7(3)	2(1)	..	..	..	..	1	..	10
Ophthalmia	4	..	..	..	4
Ornithosis
Paratyphoid
Plague
Polymyositis ..	6(3)	3(2)	..	2	..	1	..	..	12
Puerperal Fever ..	1(1)	..	..	..	..	..	..	..	1
Rubella	20(15)	..	..	5(4)	..	..	..	25
Salmonella Infection	1(1)	..	..	..	1
Scarlet Fever ..	20(15)	14(11)	20(15)	3(3)	..	2(1)	..	..	68
Smallpox
Tetanus
Trachoma
Trichinosis
Tuberculosis ..	15(11)	7(4)	12(4)	6(5)	7(5)	4(1)	..	..	51
Typhoid Fever
Typhus (Flea-, Mite- and Tick-borne)
Typhus (Louse-borne)
Yellow Fever

¹ Figures in parentheses are those for the metropolitan area.

and non-medical personnel. He also agreed that standardization was necessary for coping with disasters and in the various services. Finally, he agreed that all the papers should be published *in toto* if possible, and that all medical men should join together to help to train the lay personnel in that work.

British Medical Association News.

VICTORIAN BRANCH NEWS.

Section of Preventive Medicine (Victorian Branch).

THE next meeting of the Section of Preventive Medicine will be held in the Medical Society Hall, 426 Albert Street, East Melbourne, at 4.30 p.m. on Thursday, October 9, 1952. Dr. Jean Mackintosh, of Birmingham, who will be visiting Australia on a scholarship provided by the Vera Scantlebury Brown Trust and the Nuffield Foundation, will give an address entitled "The Planning and Organization of Personal Health Services for the Family in the Framework of a National Health Service". All members of the Branch are invited to be present.

Naval, Military and Air Force.

APPOINTMENTS.

THE following appointments, promotions *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 62, of September 11, 1952.

AUSTRALIAN MILITARY FORCES.

Royal Australian Army Medical Corps (Medical).

To be Temporary Majors.—Captains 3/40054 J. H. Cater, 7th July, 1952, and 3/40055 G. A. Scott, 1st August, 1952.

Obituary.

THOMAS LYNEWOLDE ANDERSON.

WE regret to announce the death of Dr. Thomas Lynewolde Anderson, which occurred on September 14, 1952, at West Perth.

DONALD ASHLEY BILLING CARTER.

WE regret to announce the death of Dr. Donald Ashley Billing Carter, which occurred on September 22, 1952, at Ipswich, Queensland.

ARTHUR GEORGE SCHROEDER.

WE regret to announce the death of Dr. Arthur George Schroeder, which occurred on September 21, 1952, at Adelaide.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Brandwein, Aniela Teresa, registered in accordance with the *Medical Practitioners Act*, 1938-1950, Section 17 (1) (c), Ashford, New South Wales.

Grieve, Neil McLean, M.B., B.S., 1951 (Univ. Sydney), Bodington Chest Hospital, Wentworth Falls, New South Wales.

Penna, Teresio, M.B., B.S., 1951 (Univ. Sydney), 382 Illawarra Road, Marrickville, New South Wales.

Thomas, Barrie Adrian, M.B., B.S., 1950 (Univ. Sydney), Royal Newcastle Hospital, Newcastle, New South Wales.

Diary for the Month.

- Oct. 7.—New South Wales Branch, B.M.A.: Council Quarterly.
- Oct. 10.—Queensland Branch, B.M.A.: Council Meeting.
- Oct. 13.—Victorian Branch, B.M.A.: Finance Subcommittee.
- Oct. 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
- Oct. 14.—New South Wales Branch, B.M.A.: Organization and Science Committee.
- Oct. 15.—Western Australian Branch, B.M.A.: General Meeting.
- Oct. 16.—Victorian Branch, B.M.A.: Executive Committee.
- Oct. 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.
- Oct. 22.—Victorian Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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